Geographic Education Series

GEOGRAPHY IN THE HIGH SCHOOL

Arranged by the
Committee on High School Geography
for the
National Council of Geography Teachers

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PREFACE

Interest in high school geography has been steadily increasing for twenty years, and it has been especially keen during and since World War II. High school teachers and administrators have been seeking suitable geographic materials and aid in the selection, organization, and presentation of such materials. As a result of this widespread interest, the National Council of Geography Teachers in 1946 appointed a committee to select and arrange for publication articles from the JOURNAL OF GEOGRAPHY which deal with high school geography.

Because several types of geography courses are being offered in high schools, the articles have been grouped according to the usual nature of the courses offered. The majority of the articles are the result of the teachers' actual experience in the classroom. The articles show how various teachers have worked out problems concerned with the selection, organization, and presentation of geographic materials.

No two teachers present materials in the same way, just as no two classes are alike; but the ideas and plans of capable and creative teachers should be of help to others, especially beginning teachers.

Not all phases of geography are illustrated in this volume. However, the National Council of Geography Teachers hopes that the articles will aid high school teachers in solving some of their problems and also encourage them to aid others by writing their own experiences.

The proceeds from the sale of this volume will be devoted to research by the National Council of Geography Teachers. We wish to express the appreciation of the National Council of Geography Teachers to all who have contributed to the volume.

Some of these articles were published previous to the time we entered the Second World War, and were selected because they demonstrate methods of organization and presentation. The reader should bear in mind that facts and opinions change. Authors alone are responsible for opinions and statements appearing in the JOURNAL OF GEOGRAPHY.

Committee on High School Geography

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PART ONE

NATURE AND VALUE OF GEOGRAPHY IN THE HIGH SCHOOL

DESIGN FOR HIGH SCHOOL GEOGRAPHY

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An army aviation student was sitting on the front row of the class, looking at a large globe. Suddenly he leaned forward and said, in all seriousness, "That globe is wrong. There simply isn't that much of the Pacific Ocean." This was an extreme example of the geographical ignorance of our young men; but it is almost as regrettable to be utterly ignorant of the meaning of latitude and longitude, to have no conception of time belts, or to assume that all map projections portray true areas. Nearly all of the aviation students, all but one or two in each class of forty, had these or similar gaps in their knowledge of geography. The deficiencies shown by these army students contribute to the mounting evidence of need for geographical training in high school.

In meeting the growing demand for geographical instruction in high school, administrators and teachers are faced with many problems, five of which are selected for analysis: (1) the needs which geographical education can satisfy; (2) the minimum content of the basic course, and of courses which might well follow it; (3) how these geography courses best fit into the high school program; (4) the minimum equipment for teaching high school geography; and (5) the qualifications the geography teacher should possess.

Needs Geography Can Meet

What needs justify a basic or general course in high school geography? Geographical instruction provides answers to questions we are asking and will continue to ask; develops ways of thinking which are essential to our life; builds up attitudes which are accepted as basic to the functioning of effective citizenship, whether in terms of state, nation, or the world; and develops needed skills.

Geographical Knowledge. The Second World War has raised thousands of questions which geographers have been called on to answer. We have become concerned as never before about where places are. We need to know the exact location of roads, of towns, and of production areas, and the nature of beachheads and mountain passes. We are concerned with the climate of this place or that. We have a new sense of the value of geographical knowledge.

But the war is a prelude to the peace, and the tasks of war give way to the exacting, tho not so exciting, demands of peace. Both are but phases of the one principal challenge the twentieth century is facing—to work out some effective basis of accord on a world-wide scale. We have steadily enlarged the geographical area over which peace prevails; now we have the task of making that area include all of the inhabited earth. To operate on a world scale obviously requires at least a frame of basic geographic knowledge.

The fund of geographic knowledge is almost limitless. What information is so fundamental to the thinking of the American that it should be taught over and over, be kept a part of his working equipment thruout the school years and afterward? At least this, a knowledge of the location and character of the principal natural and man-made features of the earth—world patterns of populations, occupation, government, climate, land forms, natural resources, and routes of trade or travel. As war has shown, it is impossible, and would be useless if possible, to learn the location of all of the places one needs to think about. But the individual requires a frame of reference for these facts which may be used only for the day. A friend asked for a world map and a large map of Europe. When given an atlas, the reaction was, "This is all well and good, but I just can't see the relation of these different places to others. I need a large map with very little on it." So do we all need a mental map, or better still, an imaginary globe in our minds, one we can turn at will to any position. We must try to meet the requirements of an age of world-wide interrelation with a knowledge of the interrelated areas. An imperative need for knowing about the rest of the world is with us, whether we be inclined to a stand-off attitude or one favoring participation in world affairs.

We not only need a world frame of reference, but a more detailed frame for the country within which we function as citizens.

World-wide knowledge should be matched with more detailed knowledge of the home country, its principal geographical features, both natural and man-made. Moreover, we need geographical data on an even fuller scale for our home state, region, and place. Thus at least three geographic frames of reference should be built up and kept alive by use—a detailed one of the home area and region, a less detailed one for the United States, and an even less detailed one for the world as a whole. Within these frames we can organize the data which come to our attention day by day, which we may not care to retain beyond the requirements of the moment.

Teaching these minimum essentials begins with the stories told to little children; in the early grades we customarily build up a skeletal world frame, and one for our country and perhaps for our state. Ideally, later grades fill in this frame. These mental maps need to be checked for gaps, elaborated, and used in terms of the maturing ideas of high school pupils. Some elemental facts may be learned quite early, such as the location of the Panama Canal; but their significance in human affairs is a question that may yield new truths thruout a lifetime. Too commonly we have stripped geography of its richer meanings in our effort to teach all of it to grade children. Only with more mature young people can we hope to go deeply into the meaning of geography in terms of vital human interests.

Altho a large part of the usefulness of geographical knowledge is realized in its service wherever *location* is an element of significance, it is well to remember that geographic data have many other uses, particularly as they throw light on persisting problems. The driving power behind German geopolitics has taught us to appreciate the force of geographical knowledge when made the instrument of moving purposes; we have seen how effectively geography can carry a share of the program of conservation education. We shall eventually learn that it has light to throw on the regional aspects of housing, food supply, health, and recreation. We already have a genuine appreciation of its relation to the movement of men and goods and ideas over the world.

Ways of Thinking. A wise geography teacher has said that a large part of the facts used in instruction are just so much water to make the wheels of the mind go round. And certainly one of the principal tasks of the geography teacher is to handle the work so that important details drop out of sight when their power is spent.

With all that we can do, however, the basic factual patterns slowly fade unless put to use, in later geography courses, in related work as in history, in free reading in the library, in reading magazines and newspapers. The experienced teacher, knowing what a large loss of factual material occurs with the passing of years, will not only seek for what we call large understandings but will also recognize the need for developing in the pupil the ways of thinking geographers have used. A brief identification of selected aspects of geographic thought will reveal their relation to our current needs.

One of the much needed mental qualities is to think habitually in terms of *location*. A vast portion of human living is tied up with specific places; and, unless an understanding of the place aspect is reached, our grasp of those phases of life is clearly incomplete. The eagerness with which we reached for maps, atlas, or globe, the morning of June 6, 1944, as news of the invasion of Western Europe reached us, illustrates my point. Geographic thinking is thinking in terms of particular places and all that that implies.

"The world is so full of a number of things" that we can think coherently only by some form of simplification. The need for principles of organization grows as our knowledge of the earth expands. Geography presents us with two principles in this connection: the recognition and use of patterns of earth features and of subdivisions of the earth's surface or regions. Instead of thinking of this railroad and that, this airline and that, our grasp of essentials is furthered by working out, say, the rail pattern of the world, or the pattern of air routes. It was a delight to see a group of army aviation students studying a globe on which air routes were mapped. They had been here and there by plane, but not until they examined this globe did they, by their own testimony, put the pieces together in a pattern. Similarly, weather data about different parts of Africa become meaningful when climatic maps are prepared. This phase of geography which is concerned with individual geographical features and their patterns is called systematic or topical geography. It provides concepts about which to organize our thinking, and is concerned with describing and understanding the distribution of these geographical features over the earth. In this kind of study we come to a closer understanding of the entire world, the primary object of geographic concern.

The other principal way to bring order into the mass of data about the whole earth is to think in terms of regions. Each region

may then be studied and our understanding furthered by our single-minded grasp of it. Whether we are planning the improvement of the Mississippi River, the control of erosion on the Great Plains, or a military campaign in the Paris Basin of France, the regional approach is valuable. Most problems of national planning are more effectively handled if this way of thinking about the earth is employed.

Ranking with the values that come from thinking clearly in terms of location on the earth, is another fundamental aspect of geographic thought—our concern with the *natural environment.* Habitually to evaluate current events in terms of the natural environmental setting is one of the fruits of geographic study. This contribution has different facets—the *influence* of weather conditions on English Channel crossings or on the price of wheat, the *relation* of health in the Philippines to air temperatures, the *adjustments* called for in attempting agriculture in an arid or hilly region. A sensitiveness to the possibilities and the liabilities provided by the natural environment is one of the needs that geographic study helps to meet.

Overlapping somewhat with this appreciation of the natural environment is a larger concern in what geographers call *relationships.* Without a recognition of how each place is related to others, location on the earth becomes a barren study. Consideration of relationships runs thru all geography, but two aspects are selected here for special emphasis: the relation of man to place conditions, particularly to the natural environment, and the interrelation of places and people. In encouraging students to think in terms of man-nature relationships, we do not stop with the identification and interpretation of such relations. We are also concerned with passing judgment on them. Is this the kind of land use which conservation dictates? One of the principal values in this kind of thinking is the habit of rising to the challenge present in the whole problem of conservation of natural resources. A study of the interrelations of places and people likewise leads on to the problem of preserving peaceful relations, safeguarding those interregional and international connections which make for good will and well-being.

Growing out of the relation of various geographic features on the earth is another fundamental in the geographic approach to world understanding—the principle of world unity. For the geog-

rapher, the entire earth is one unit, the one object of his study. Whether he be concerned with the circulation of winds, the movement of peoples, or world trade in wheat, he must recognize, sooner or later, the unity of the earth. This habit of thinking in world terms is surely an essential of our life today. Just to give one supporting point: we say much about our growing independence of the limitations of our local environment, as man has advanced from savagery to civilization; and it is true that as time goes on, man is less and less limited by the conditions of the place where he lives. On the other hand, as this freedom has grown, he has become more and more subject to world limitations. The farmer in the Great Plains, for example, can have a variety of foods, even tho the climate permits few crops to be grown; but in selling his wheat to obtain these articles which cannot be grown locally, he must seek distant markets where he competes with wheat regions scattered around the world, and where he is made keenly aware of the limitations of the world market.

Desirable Attitudes. In acquiring basic knowledge of the geographic features of the world and in learning to think about the world in the ways just discussed, the geography student is almost certain to acquire new attitudes. Among the many attitudes which are furthered by effective geography teaching is a sympathetic understanding of other peoples. Distant peoples and places become more real, their problems more clearly understood, their achievements appreciated, and our relations with them more clearly evident. Whether it be in our relations with people in other parts of our state, our nation, or in foreign areas, sympathy and good will, based on understanding, are apparently prerequisites to a peaceful solution of our differences and to co-operation in our attack on common problems.

Geographic Literacy. Secondary education should meet the need for geographic literacy. As our educational system is set up in the schools, it is largely based on reading, and a major part of the education which goes on in the post-school years is thru reading. In reading materials which have geographic quality, the student is concerned with words and sentences, with maps, with graphs, and with photographs. Understanding what one reads requires a grasp of many geographic concepts and the ability to get behind a map to the ideas which it conveys, to get the meaning out of graphs, and to analyze photographs in terms of the basic ways of thinking

outlined above. We know that the average graduate of the elementary grades is far from having the desired competence. Here geography teachers have an opportunity to contribute to the end which the American Council of Education placed at the head of the list of contributions which the high school should make to general education—to make pupils competent readers.

CONTENT AND ORGANIZATION OF HIGH SCHOOL GEOGRAPHY

In view of the attention given to the continents in grade geography and the need for participating in an evolving world community, the basic high school course should be one in *world* geography. Nothing less than an enlarged understanding of the entire inhabited earth should be the goal. For each age there is a desirable geographic orientation: for the ancient Egyptians, an understanding of the Nile Valley sufficed; and the early Greeks were largely concerned with the Mediterranean Sea and connecting straits and seas; but today we require a world view in order to understand many matters of deep concern to us. Ideally, the world view will have been begun early in the schooling of the individual pupil, and ideally this world view will persist thruout the period of formal education. In the high school we need to fill in, to check up, and to secure a firmer grasp of the world pattern; we need to use whatever understandings have been built up before; we need to clarify our world geography as a basis for world history; and we need this world view for renewed study at a higher level of our home region and country. The urgent necessity of world understanding on a mature level is surely evident to all.

Human Geography. This course in world geography should be human (or cultural) geography from beginning to end. Man, man in place on earth, should be kept in the foreground thruout the study. To say that the course should be one in human geography does not mean, however, that there should be no consideration of such items as land forms and climate. It does mean that any study of natural environmental conditions should be made in terms of the needs and aptitudes of people; that there should be a functional evaluation of every physical condition considered. Such an approach does imply, however, that major attention will not be given to the intricate causes of climate or land form conditions. Such matters may very properly be taken up in a general science course or in courses in physical geography or physiography.

The Framework. No sooner do we decide on a course in world geography than we immediately face this question: how shall we divide up the world for study? Here we face one of the problems which have troubled geographers since the time of the ancient Greeks, for it is impossible to study the entire earth without subdividing our major task in some way. Thruout the history of geographic endeavor men have gone at this problem of studying the earth in one or another of two ways, or by a combination of the two: (1) by dividing the earth up into parts, or regions, and studying each part; (2) by leaving the earth whole, so to speak, and tracing out the individual patterns, both those which nature has provided, such as climatic features, and those which man himself has created. Where the first is followed we say that the organization is regional. Where the second is used, we speak of it as topical or systematic. Each of these approaches has its strength and its weaknesses. *I am not inclined greatly to favor one over the other, because I firmly believe that the competent teacher can secure the desired objective by either method if supplemented by liberal use of the other.*

A Topical-Regional Organization. A very satisfactory organization has these three parts: (1) a study of the elements and world patterns of the natural environment; (2) a consideration of the elements and world patterns created by man; and (3) a study of these natural and man-made elements as combined in important regions of the world.

If the course is introduced, as I believe it should be, with some attention to systematic geography, the teacher may go directly to the problem of clarifying the geographic concepts of the student and of filling in and amplifying his knowledge of world patterns. Geography does not have a highly specialized vocabulary, but does have a goodly number of terms that need to be discussed at some length, so that they may be used in the comparative study to follow. Such terms as latitude, longitude, low latitudes, delta, cyclone, hurricane and strait, need to be discussed in a meaningful way in terms of the fundamental problems men have met in making a satisfactory living on the earth. Special attention should be given to the arrangement of these features over the earth. We are not so much concerned with weather as such as with the weather experienced in different parts of the world; not with railroads but with the actual railroad patterns of the different regions and of the

earth as a whole. Too commonly the study of the elements of the natural environment ends with an identification and discussion of the conditions and leaves the pupil without a clear and lasting grasp of world patterns. To fail to teach the arrangement of these elements over the earth is to fall far short of the goal of world geography.

Some geography teachers introduce, in connection with the natural environment, practically all the human geography to be considered. For example, some organize the entire year's work on the basis of climatic regions and have poured into that mold all that is said about man and his works. This is carrying the emphasis on the natural environment too far. It is very certain to make environmental determinists of our pupils. Enough reference to man and his works should be brought into the discussion of environmental elements to see their significance in human affairs; but of equal importance is a separate study of those world patterns for which man himself is responsible.

Outstanding among the world patterns created by man are population, occupations, political arrangements, and circulation. One of the very best ways to begin a course in world geography is to start out with a study of the distribution of man and his works over the earth. Likewise, one of the best ways in which to close a course in human geography is to give definite attention to the circulatory patterns, routes of travel and trade and lines of communication. One of the principal ideas which should run clear thru a course in world geography is this, that the interdependence of the various parts of the earth has been brought about by circulation of men and goods and ideas, of winds and birds. Since our geography course is designed to help us understand this global world in which we live, a major place should be given to a geographic analysis of the ties which bind us together and of contacts thru which we compete and co-operate.

Ideally, such a study of the cultural patterns of the world, population, occupation, production, government, and circulation, should be followed by attention to specific regions or countries, where various cultural and natural environmental elements are seen in combination. If, as is wise, the home country is used thruout to illustrate the various points being made, it might be desirable to turn to foreign lands in this last phase of the work.

Even tho we grant that the world course in geography should

ideally consist of these three parts, a study of the natural patterns of the world, of the patterns which man has created, and of the combinations of those conditions in certain parts of the earth in which we have particular interest, we must recognize that such a plan, if followed leisurely, would crowd the year. For that or other reasons, the teacher may prefer another organization.

A Topical Organization. Another thoroly defensible plan is to divide the course more or less equally between a study of natural environmental conditions and those features for which man himself is responsible. The course, in other words, would be topical thruout. This procedure has a great deal to commend, particularly if the teacher centers the discussion on world patterns, making clear all the time that geographic facts refer to specific places. Its great weakness lies in the fact that it may fail to give a clear notion of how these various conditions combine to determine the individuality of specific regions. In my opinion, therefore, this approach should be brought to a close with one or more regional units, dealing with such areas as the home region or nation, or a selected part of Europe or Asia. If this material is not a part of the text being followed, it could easily be added by supplementary readings and other materials.

A Regional Organization. Recognizing the weaknesses of the topical approach, some teachers prefer to organize the work about countries and continents right from the start. Such a method has the great virtue of always making the pupils aware that they are studying particular places. It is a very concrete approach and ties in with the thinking of the pupils in connection with what they read in newspapers and magazines. It may, however, miss one of the main points of the course, namely, to develop a world viewpoint. On the other hand, if the teacher follows the comparative method and repeatedly points out relations between different parts of the world, the world view is sure to be presented. If this plan is used, I strongly recommend that the course be both opened and closed with topical units, such as the world distribution of population for the beginning and a study of world trade and travel at the close.

PLACE IN THE HIGH SCHOOL PROGRAM

This year course in world geography is best placed in the ninth and tenth grades where it can precede elective courses in geography and related aspects of the other social sciences. This course

in world geography should be considered a part of general education and should be required of every student. If, perchance, it seems that full credit cannot be required of everyone, then it may be possible to require half a year's work, with the other half devoted to a closely related subject. For example, the new social science course of study for the ninth grade in New York State combines world geography with an introduction to the economics of world citizenship. This combination makes it possible to carry some of the main ideas and ways of working of geography all thru the year. Less than a full year is not enough time in which to meet the needs we now recognize in the geographic field. Even a full year is not enough time in which to meet those needs in a thoroly adequate fashion. To keep the study of geography alive thruout the secondary period will require either additional courses in the field or considerable attention to geographic matters in related studies.

This general course should be and is commonly grouped with history and the other social studies. Unfortunately for simplicity in classification, the broad field of geography is both physical and social, that is, certain phases deal very specifically with the earth, other phases almost exclusively with man. I believe that it is well to recognize this distinction; indeed, I find by an examination of college catalogs that the distinction is commonly recognized in stating college entrance requirements, with credit being allowed for human geography in the social sciences and for physiography or physical geography in the physical science division.

Altho human geography is commonly classed with the social studies, it should not lose its identity in that group. This general course which is recommended as a required one for the ninth and tenth grades should be a *geography* course, with wide ramifications, of course, into related bodies of knowledge. Even a hasty examination of the list of needs that geography can help to fill will surely lead one to the conclusion that these needs are not so well met by some other social study. The problems and findings of geographical science must be studied if its educational values are to be realized. The educational returns from a study of geography will be greatest, however, if the teacher makes the study broad, if materials drawn from such related fields as history and sociology are used whenever pertinent. In other words, I am confident that it is wisest for every student of human behavior to strive to be aware of all of the major approaches to the study of man and to build his par-

ticular specialty on a broad foundation. We would then hear less of the shortcomings of the individual social studies and of the virtues of fusion.

Where the teaching staff and equipment are adequate, it is highly desirable to follow such a general course by an elective in geography; or, if the student is majoring in commerce, by a required course in economic geography. Among the desirable electives are: (1) geography of North America, for which splendid teaching materials are now available on the high school level; (2) political geography of leading countries; (3) conservation of natural resources; (4) economic geography, looking toward the preparation of students for commercial positions; (5) courses in what we may call physical geography—geomorphology, meteorology, and climatology. Where additional courses are given, the geography staff will ordinarily be competent to pass on the questions involved. Attention here is limited to the general introductory course.

MINIMUM EQUIPMENT FOR TEACHING GEOGRAPHY

This basic high school course in world geography does not require a great deal of expensive equipment. On the other hand, some materials are essential, and certainly a room should be fitted up in which all of the geography classes are taught. Anyone who has had the experience of moving about from room to room, teaching a geography class in this room and that, knows that such a procedure is highly wasteful and that it is next to impossible to do the best job under those circumstances.

Texts. To my mind the most essential piece of equipment in teaching geography is a geography text. It is a source of readings, a collection of pictures, and a collection of maps, and not uncommonly contains valuable aids to study. Some years ago I talked with a high school teacher who bragged that he never used a text. I asked him what he did use as a guide. He produced a two-page mimeographed list of topics, and yet he had no book collection and the most meager map collection. Perhaps the controversy over text versus no text can best be answered in this way: be no slave to a text, but use one or more until you have collected readings, pictures, and maps which are as good and which can be made available to all of the students. Even then you may want a text as a basis for discussion, to give all a common ground on which to work. To me the ideal is for the beginning teacher to lean rather heavily on

the text, gradually working toward the point where it is more a source book and a collection of photographs and maps than a real course of study.

Globes. Next to the text I would place the globe. A physical-political globe on a floor stand, one that can be adjusted in height and can be moved around the room, is essential. In addition, there should be another globe, possibly a cheaper one, in a cradle, so that it can be moved around easily and studied in various positions. The use of a globe resting in a cradle is one of the more valuable innovations of recent years. If funds permit, it may be desirable to purchase a large slate globe, one on which places and various other facts can be shown. The average high school will not be able to afford a tellurian but may well own half a dozen of the little disc-like devices which S. W. Boggs has drawn up for the study of time belts, the so-called Boggs Teletime.

Maps and Atlases. In the minimum equipment for world maps are the following: a physical-political map, preferably on an equal-area projection; a political map, equal-area projection; a blackboard outline map, equal-area projection; a population map; a two-season rainfall map; a world vegetation map; and a polar-projection map, showing populated areas, trade routes, and so on. For each of the continents a physical-political map is desirable. In addition, we should have a physical-political map of the United States and a blackboard outline map of our country too. There should also be a physical-political map and a blackboard outline map of the home state. This minimum map collection can be added to in two principal ways—by securing additional wall and desk maps and by gathering materials for the making of maps, charts, and grafs. The class should have a number of outline wall maps on heavy paper, on which to trace whatever information is not available but is desired for wall use. Sometimes inexperienced teachers spend a great deal of money on maps with expensive mountings. It is my conviction that for most purposes the ordinary wooden rollers at top and bottom of the map provide an entirely satisfactory arrangement. Certainly, if the money for equipping the geography classroom is seriously limited, very little of it should be spent for expensive mountings.

We might hope for the time to come when our map collection would be supplemented with an atlas in the hands of every student. As a matter of fact, however, most geography textbooks for high

school include an atlas, either in the back of the book or scattered well thru it. This is another of the main reasons for having a textbook available in the hands of every student, even tho the teacher prefers to be independent of the organization which the text provides.

Pictures. Pictures are, of course, an essential in all geographic study. Fortunately, our texts are well equipped with them now so that the burden on the individual teacher is not as great as formerly. These text pictures will need to be supplemented, however, in a variety of ways. To do this, it is highly desirable, tho not absolutely essential, that the room be equipped for showing slides and opaque projections. This is one of the main reasons for having a geography room. The lantern should always be in place, and the room so equipped with dark shades that it can be darkened quickly for the lantern exhibit.

The use of motion pictures is a highly valuable feature of geographic instruction and is strongly recommended when circumstances permit. There is little to be said, however, for the use of occasional films at times which do not fit into the program. Slides which can be used when needed are preferable to elaborate sound movies which have little relation to the theme in hand. Certainly first-class work in geography can be done without the use of motion pictures.

Furniture and Equipment. In addition to the equipment noted above, it is wise to provide some instruments for weather study, such as a thermometer and barometer, and specimens of the common rocks and minerals. Most of the exhibits can be collected by the pupils, however, and cases or shelves should be provided for holding them. The geography room should also include a space for storing wall maps, a filing cabinet or a series of drawers where desk maps, photographs, clippings, and pamphlets can be stored, a large blackboard, and a large amount of bulletin-board space. Indeed, I am convinced that the need for much bulletin-board space is critical, for, with room for display, most deficiencies in maps and slides can be counterbalanced by the use of materials which the pupils can gather themselves.

If the pupils are to do what they can toward equipping the geography classroom, they will not only need outline maps and ruled paper, but also drawing pens, triangles, rulers, and tracing paper. Colored chalk, preferably of the lighter shades, is also an essential.

In spite of the length of this list of equipment, the basic year course in geography can be taught with relatively little cash outlay at the beginning. An alert class can quickly assemble a wealth of photographic and map material at almost no expense. With a globe, a first-class physical-political map of the world, and some up-to-date atlases, the class can get under way. For a more complete analysis of the problem of equipping a high school geography room, the reader is referred to the article by Neil F. Martin which appeared in THE JOURNAL OF GEOGRAPHY, Vol. XXXVIII, 1939, pp. 226-232. This article gives the experiences of a mature, competent high school teacher.

WHAT TO LOOK FOR IN THE GEOGRAPHY TEACHER

The geography teacher should be trained for the job, possessing both special training in geography and a rich background in related fields; and, if at all possible, he should possess certain personal qualities which are perhaps not so necessary in other fields.

In checking over the desired training for a high school teacher of geography, I need only to remind you of the conclusions of the Committee of Standards of Certification for the Teaching of Geography in High Schools, of which Alfred H. Meyer was chairman. As concluded in their report (JOURNAL OF GEOGRAPHY, Vol. LXII, 1943, p. 460), the certificate in geography should in every case meet as high a standard as that set for history. As a part of this requirement, the teacher should have a general introductory course in the principles of college geography, 3-6 semester hours; a regional course in continental, historical, or political geography, 3 semester hours; and a topical course in economic and commercial or conservational geography, 3 semester hours. Certainly this is an absolute minimum, no matter what the certification requirements of the individual state may be.

Besides courses in geography, equal to those normally required of teachers of history, I am convinced that the best geography teacher will have a good grounding in related social and physical sciences. In the social sciences, history, regional sociology, economics of land utilization, anthropology—the list of possible approaches is long. Without this training, however, the student will not, as a rule, appreciate the ways in which man makes his own geography. In the physical sciences, geology, meterology, and botany are of outstanding importance. Without some such training, the teacher will lack an understanding of the physical earth. As

human geography deals with both man and the earth, it would seem imperative that both phases of our environment be investigated by the prospective teacher. As the course designed is one in human geography, however, the social side should receive the major emphasis.

To the requirement of adequate training in geography and related social and physical sciences, I am impelled to add another. The most effective geography teacher will have a genuine sympathy and liking for men of all lands. The narrow, the bigoted, the intensely nationalistic, the belligerent individual may convert geography into a school of hate, of odious comparison. If geography is to function in an effective way in furthering an understanding and appreciation of other peoples, whether in our own nation or in foreign lands, it is necessary that the teacher himself be thoroly imbued with regard for his fellow men.

CONCLUSION

There is general recognition that high school students need the kind of education that the study of geography can provide. To meet that need, every high school student should have at least one year of world human geography, designed, among other things, to give him an understanding of the world as a whole and of its various parts. In order for this required course in geography to be carried out most effectively, it should be taught in a room fitted up for the purpose. The equipment need not be expensive in the beginning, and there should be adequate provision for assembling the kinds of materials which the students and the teacher can themselves provide. Such a program calls, obviously, for a trained teacher, not simply for some one who happens to have a free period. This teacher will not only be well grounded in the facts and methodology of geography but will also have a rich background in related physical and social sciences, and will possess the kind of inquiring, sympathetic mind that views men all over the world as brothers in the common problem of living the best kind of life possible on this earth.

THE NEW GEOGRAPHY

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Changing ideas about nature and changing instruments of power give geographical science a peculiarly human quality. To a high degree the earth is what we think it is. It is but a slight exaggeration to say that all geography is always new. When an explorer takes plants (maize, potato, wheat) from primitive centers of growth and carries them to new environments, he may succeed in growing highly resistant strains adapted to hard conditions where ordinary strains fail. Each plant-breeding success means the reappraisal of our climatic boundaries, soil types, and cultivation techniques. America has been rediscovered a score of times by new ideas, by plant experiment, by human enterprise.

The introduction of the maize plant and the potato altered the farm economy and stepped up the industrial power of half of Europe. The grasslands of the Canadian Prairie Provinces became an agricultural empire when new breeds of wheat were introduced that are adapted to light rainfall and a short growing season. When exploration is ended and the map of the world completed, discovery will still go on—discovery of things we can do and grow and exchange and enjoy as science discloses new areas of opportunity.

Like plants, minerals both stimulate and limit man's occupation of the earth. When vanadium was found in the Peruvian Andes, and black diamonds in Brazil, they became magnets of opportunity. When English industrialists began large-scale mining and distributed coal far and wide across the seven seas to coalless towns and harborages, they changed the nothingness of many isolated island sites to vital stations in a network of world power—naval power, trading power, colonial power. The instruments of power were skillfully combined. Machines, combined with systems of credit, and implemented by government were among such instru-

ments that altered the meaning and possibilities of the earth and gave geography as well as economics a new dynamic quality. Streams of power followed geographical exploration and colonization right down the years from John the Navigator to Peary, Scott, Nansen, Livingstone, Sturt, and the airborne moderns.

The surveying instrument is the first tool of the geographer. None knows better than a sailor raising a landfall that we must determine accurately where things are and make reliable maps. The adding machine is to human geography what the surveying instrument is to a map. We must count and measure and inventory people and their resources before we can begin to understand the significant relations of human societies, great and small. Every geographer must be trained to understand the structure of such human societies, and how they work, for the social and economic system of a nation expresses the knowledge, idealism, standards, and dynamism of its people. It is in fact the chief national power plant. In theory the material power generated in the world is for human good. If a spiritual element is wanting in the power plant the result may be deplorable—what the critics call "scientific materialism." Only sustained loyalty to spiritual ideals makes either science or exploration desirable or beneficent in the long run.

Ptolemy's charts were used by sailors and it is incidental that sailors include warriors. He was not thinking of that modern devil's brew, the Nazi brand of geopolitics. He was curious, ingenious, and enterprising in the interest of navigation. Von Humboldt, also a geographical measurer and appraiser, said that the diversity of the earth was man's great opportunity: what all countries had, each could have, and be the better for it. South African fruit in London shops and Pacific copra for American soap is what he meant, put into homely modern terms. Lord Bryce once called the Panama Canal a piece of geographical surgery. Boulder dam to add water and Florida canals to get rid of it are among similar triumphs that, lamentably, do not yet include control of destructive droughts and floods.

The earth is not a perfect home for man. Some of the drained swamps of Florida, now truck gardens, will not produce acceptably unless copper is added. Most soils are deficient in something, most climates call the tune on man's comfort and crop possibilities.

Using the tools of physics, chemistry and biology, geography puts together the parts of a region that have human meaning. All of the great geographers of history discovered human mean-

ings, not merely coasts and mountains and river systems. They peopled new lands with imaginative human designs.

Popular cartographers have recently given a semblance of newness to the earth by inventing unconventional map projections. They have stimulated popular interest in maps, a good thing. Their novel projections are the equivalent of the candid camera. Just as we got tired of seeing men upside down or feet foremost, so map readers will tire of bizarre projections. Maps are conventions, not pictures. Also they spell out an international language for the wider comparisons of people and physiography. Every projection has a special meaning and purpose and purposes are legion. For general scientific use and for international agreements we also need maps that are familiar in shape and size.

The greatest cooperative map enterprise, the millionth map (an inch on it represents a milion inches in nature, or 15.8 miles) is designed to give each country a familiar national map in a world mosaic. When completed, the millionth map of the world will be almost as big as the facade of the Library of Congress. It took 12 men 20 years at the American Geographical Society of New York to do just the Hispanic-American part of it, or the equivalent of one man working 240 years. It is not an enterprise in power rivalry, but in good neighborliness. Hispanic-American scholars and governments cooperated with *mutual benefit,* not war, in view. A number of boundary disputes have been settled in part because the map existed as an impersonal, scientific, and disinterested tool of conciliation at the moment it was needed.

Land settlement is becoming a science because critical geographical inventories of resources can now be made with scientific tools of investigation. No such failure as the Roanoke Colony need take place today. Yet displaced men and women, homeless because of war, search for the securities of life on an earth where the best places have already been taken. When we put science to work in a marginal region of potentially greater settlement, such as Western Australia or Alaska, we save human lives at the expense of brains and money.

An imaginative grasp of space and time is required of the modern scientific geographer. No other science puts humans and earth in their regional framework and tries to appraise the systems of resource-use that men have created. One important country took no census between 1876 and 1940. By 1900 no one knew, in many respects, what that country was! This means that its govern-

ment administered territory which had not been accurately measured, and taxed or overlooked people it had not counted or classified. Among the earliest documents of Babylonia, Egypt, and Rome are census lists. Counting and administration are inseparable if good administration is the end in view, 5000 years ago, and today more than ever.

The earth is in *changing* relation to man: this is the distinctive contribution of geographical science from Herodotus to Von Humboldt, Vidal de la Blache, and Mackinder. The new geography is new in materials and devices, and in knowledge of the laws of modern science. But its central principle has remained the same for countless generations. Whether men use the advantages of the earth for good or evil ends is a question in social and political morality. Science leaves the field at this point with a single challenging conclusion: the earth is big enough and rich enough for us all if we learn how to live in peace.

HIGH SCHOOL GEOGRAPHY AND GEOGRAPHIC THINKING

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GEOGRAPHIC THINKING ABSENT IN HIGH SCHOOL

It is apparent that as a nation we are unable to think geographically. Geography has been taught in our public schools, yet we do not have geographic thinkers in the public at large. This is due to the lack of well organized courses in geography which provide training in geographic thinking from elementary school thru high school. By the time the pupil reaches high school he has had a smattering of geography. His high school course furnishes little in addition to what he has already had.

The high schools have an opportunity to present courses that train in geographic thinking. It is their responsibility to do so. What the high school course is, depends largely upon the training and viewpoint of teachers and administrators. Perhaps, there is no other high school subject about which there are greater differences of opinion. To some, geography is a study of location and the listing of products; to others, the accumulation of statistical

data and the memorizing of unrelated facts. To all too few is it a study of relationships, or an opportunity to explain and interpret present human activities. To all too few, geography is the interrelationships of one world region with another, or the interplay of political forces adjusted by man's activities to various environments.

It is time that executives who make school curricula, seriously consider just what geographic thinking is; what it includes and what it does. It is time that they evaluate their geography textbooks in terms of the geographic thinking these books make possible. It is time that they evaluate geography instruction in terms of the geographic thinking this instruction stimulates.

Many high school geography courses are based on out-moded textbooks, selected by teachers who lack the technique of geographic thinking. Many high school geography courses make little or no contribution to geographic thinking since few who formulate these courses are acquainted with such thinking or concerned with its development. Under such circumstances students become memorizers of facts rather than fact users and interpreters; they become the geographic illiterate of which there are too many.

WHAT GEOGRAPHIC THINKING INVOLVES

Barrows has well said, "The chief end in teaching geography is not information, but ability to think geographically. The outstanding educational objective of geography, in other words, is to help make purposeful thinkers and successful doers, not to create animated gazetteers. In order to think geographically, pupils need something suitable to think about, an inducement to think, and appropriate guidance in thinking."[1]

Geographic thinking calls for the use of facts of two different categories, one pertaining to man, the other to factors of the natural environment in which man lives and works. In finding the relationship between these two sets of factors geographic thinking is done. Geographic thinking varies in difficulty. There are great differences between an interpretation of simple human adjustments in lands of little rain, for example, and an interpretation of the world political pattern with the interplay of ideas, ideals and aspirations of diverse peoples living under diverse environmental

[1] Barrows, H. H. Some Critical Problems in Teaching Elementary Geography. JOURNAL OF GEOGRAPHY, Vol. XXX, December 1931.

conditions. Between these extremes there are definite steps in geographic learning, each level making its particular contribution to geographic thinking.

Many high school textbooks list facts and make feeble effort to put these facts to work. An inexperienced pupil using such books is overwhelmed and confused. He is confronted with carefully pigeon-holed information concerning climates, land forms, bodies of water, latitude, longitude, world-wide occupations and the like. He is exposed to facts needed in geographic thinking but never given opportunity to really think. There is little for him to do other than attempt to memorize. The memorizing of facts is not geographic thinking. Yet, how often has it been accepted as a sign of proficiency in geography!

Facts needed in geographic thinking are obtained from many sources. The printed page is but one. Maps, globes, graphs, diagrams, statistical tables, pictures, field trips and the like are sources of facts. Most texts, however, provide little or no opportunity for such tools to be used. Many courses in geography fail to provide training in the use of these tools chiefly because the courses are based on generalized facts arranged in condensed form on the printed page. Students of geography should use the tools of geography and should know what each tool can do and where and when it best serves. These tools should not be ends in themselves, but rather, the means of securing facts that function in geographic thinking.

RECENT DISCOVERY OF OLD IDEAS

That school geography has failed to relate pupils to the world in which they live is evidenced by the recent "discovery" that the world is a globe. People are accepting this idea with enthusiasm and viewing it as something new. They are talking global geography. Textbook writers are capitalizing on this interest. Global geographies are appearing, many of which are still nothing more than a catalog of facts under a new name.

Whether the enthusiasm of the moment will make the global concept worthwhile remains to be seen. This concept is the basis of the understanding of great-circle routes, of reversal of seasons in northern and southern hemispheres, of increase in length of summer days as distance from the equator increases, and increase in length of winter nights. Such understandings are needed today

in the interpretation of news from scattered battle fronts. Time and space have been eliminated. Pupils view world events as they happen. They should be able to think in terms of a global world.

Likewise, people are now fascinated with the polar map projection. Many believe it is something new. To them it is another sign of modern times. Texts with such maps surely must be up-to-the minute, they reason. Classrooms with such maps, certainly are up-to-date. But, how are such maps used? Are teachers willing to accept this projection without thought? Are they willing to have their pupils read and believe that we now "loop the loop" over the north pole; that future air routes will be polar routes; that the polar ice cap will become an emergency landing field, and so ad infinitum? Here is where ability to think geographically is needed.

LACK OF GEOPOLITICAL THINKING

Geographic thinking is more than a classroom exercise. It is part of everyday living. It is needed in interpreting world events and in evaluating opinions and decisions, whether of local, national or international importance. World political problems, world commercial problems, world security, world trade, world peace are a few of the problems uppermost in our minds today. Basically, all are problems of geography. An understanding of any one of them involves geographic thinking. Their solution must be based on sound geographic thought.

A serious defect in present high school geography instruction is the lack of problems involving geopolitical relationships. Opportunities are needed to aid pupils in their understanding of current world problems. It is time that our high schools attend to these world problems, not entirely from the standpoint of the historian, the sociologist and the economist, but also from the viewpoint of the geographer. The beginnings of a sound foreign policy are found in the geographic analysis of current world problems. Every news item concerning the far flung battle front, the diplomatic relations of countries and future world trade emphasize the need for geographic thinking.

TRAINED TEACHERS ARE ESSENTIAL

There is need for political geography in the high school. It should be taught by trained geography teachers, not by anyone who happens to need an additional teaching hour. Geography has its

philosophy, its scientific principles and its particular type of thinking. It calls for skill in analysis and interpretation. Teachers should be masters of the field. Only under the guidance of prepared teachers can pupils secure worthwhile world understandings, acquire skill in collecting and using facts, and arrive at conclusions that are sound.

The Report of the Committee on Standards of Certification for the Teaching of Geography in High Schools calls attention to the diversity in certification requirements of all subjects and says: "For geography, the situation shows far more diversity than for most subjects, and it is further complicated by the fact that the exact license status for geography is almost indeterminable in some instances, and at the best uncertain."[2] This report recommends a "Geography Master Standards Pattern" and states "That geographic training is as essential to the social studies program as in any other discipline and should be specifically recognized."[3]

MORE TIME FOR WORLD UNDERSTANDING

As a rule, Commercial or Economic Geography, is the only course offered to high school geography students. Frequently, this course is completed in a semester, which is far too short a period for the interpretation of the world commercial pattern. To contribute to a world understanding Economic Geography should be organized so pupils are aware of the interdependences of world producing and world consuming regions and familiar with the movement of commodities over world trade routes. This requires more time than now available in semester courses. The short courses are often little more than the naming and listing of products with no attempt to build the much needed world understanding. Such courses follow the textbook and make little effort to train in geographic thinking or the use of geographic tools.

For a complete world picture, a course in Political Geography should follow Commercial Geography. The world political pattern cannot be wisely interpreted without an understanding of the world commercial pattern. Political ideas and policies are related to commercial activities, which in turn, are related to the physical makeup of the home land and of distant lands. There is need to discover

[2] National Council of Geography Teachers. Report of Committee on Standards of Certification for the Teaching of Geography in High Schools. Journal of Geography. Vol. XLII. February, 1943.

[3] Ibid.

the reasons for the interdependence of regions, the reasons for the domination of some nations, the minor roles of others, the reasons for the political policies and the military activities which foster national aspirations. Political geography with all its ramifications is earth based. Ability to interpret man's political activities in terms of world environments will furnish a firm foundation for the discussion of international problems.

At the moment there are those who are concerned with the problems of the postwar years, and with curriculum changes that will prepare the high school student to intelligently meet these problems. The National Council for the Social Studies in its publication, "The Social Studies Look Beyond the War" urges "—continued and, where necessary, increased attention to the history, geography, and life of other countries and peoples at both elementary and secondary levels."[4] This report states, "The social studies have a special responsibility for enabling citizens to bring informed, thoughtful, and purposeful intelligence to bear on international, national, and individual problems."[5]

This informed, thoughtful and purposeful intelligence is to be gained chiefly thru history, civics, sociology, economics and the problems of the consumer. The need for geography is recognized but no clear-cut program for geography instruction is offered. There is no mention of the need for geographic thinking or recognition of its importance in the consideration of world affairs. That habit of thought which is geography's distinctive contribution, is not anywhere mentioned. It is a question how it could ever be developed if geography units are to be sandwiched in with those of history and other social studies.

PRESENT WEAKNESS IN GEOGRAPHY COURSES

The present status of high school geography is bewildering. What should be done in this field and what can be done are two entirely different things. If high school geography were the culmination of a well organized geography program, students would have a broad foundation. They would have understandings upon which to build. They would be doing geographic thinking and would be able to carry this thinking into the advanced fields that right-

[4] The National Council for the Social Studies. The Social Studies Look Beyond the War. A Statement of Postwar Policy prepared by an Advisory Commission of the National Council for the Social Studies. November, 1944.

[5] Ibid.

fully belong at the high school level. They would be ready to attack world problems without the necessity of building understandings of world parts. Their work would be a synthesis of past experiences. They would be ready for a consideration of world commercial patterns and world political patterns, which presuppose an understanding of world regions.

But most high school students lack this foundation. Any attempt to present world patterns necessitates teaching elementary geography. Time is consumed in laying foundations and the development of geographic ideas at high school level is impossible. This situation is regrettable. It exists thru no fault of the high school student, but because of poor organization of geography courses and of lack of vision in course planning. It is perpetuated thru courses concerned primarily with summaries of facts and based upon generalizations of the high school text.

GEOGRAPHY INSTRUCTION A MATTER OF PUBLIC CONCERN

The problems of high school geography are a matter of concern for the public as well as for the geographer. In order to prepare young men for positions of responsibility with the military forces, the army found it necessary to put thousands into geography classes. These classes had to do a job our schools had failed to do. Renner, in the December 1944 issue of the JOURNAL OF GEOGRAPHY, shows the necessity of a world understanding based upon sound geographic thinking. He makes clear an enlightened public is a geographically minded public.[6]

The seriousness of the present situation in high school geography instruction is reflected in the articles appearing in current issues of the JOURNAL OF GEOGRAPHY. The importance of training in geographic thinking is constantly emphasized. Cutshall, in the September 1944 issue of the JOURNAL, recognizes the lack of training of high school students and advocates a two year course in geography for all high school pupils. The first course, an elementary one, will lay the necessary foundations. The second course, World Geography, based on the first, will find pupils ready to cope with world conditions and will furnish opportunities for advanced geographic thought.[7]

[6] Renner, George T. What the War Has Taught Us About Geography. JOURNAL OF GEOGRAPHY, Vol. XLIII, December, 1944.

[7] Cutshall, Alden. Worthwhile High School Geography. JOURNAL OF GEOGRAPHY, Vol. XLIII, September, 1944.

It is time to start building a program putting geography on the high school level. It is past time when such a program should be a reality. Until it is a reality, high school students should be guided in geographic thinking at whatever level it may be. They should acquire skills in the use of geographic tools. They should become fact users, able to analyze and reach their own conclusions. They should be given a start in geographic thinking as an essential basis for active, world citizenship.

GEOGRAPHY AND REGIONAL PLANNING*

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THE TENNESSEE VALLEY AUTHORITY

On May 18, 1933, the Seventy-third Congress approved the Tennessee Valley Authority Act of 1933. The introduction states that it is an act:[1]

To improve the navigability and to provide for the flood control of the Tennessee River; to provide for reforestation and the proper use of marginal lands in the Tennessee Valley; to provide for the agricultural and industrial development of said valley; to provide for national defense by the creation of a corporation for the operation of government properties at and near Muscle Shoals in the State of Alabama, and for other purposes.

Following this are the thirty sections of the Act. Twenty-eight have to do mostly with the organization, powers, duties, and limitations of the Board of Directors, which is the body corporate, and with dams, reservoirs, fertilizer, power, flood control, navigation, and the like. The two remaining sections, twenty-two and twenty-three, are of special interest in the present discussion because in them the Congress made possible regional planning in the Tennessee Valley. These two sections are as follows:[1]

Section 22—To aid further the proper use, conservation, and development of the natural resources of the Tennessee River drainage basin and of such adjoining territory as may be related to or materially affected by the development consequent to this Act, and to provide for the general welfare of the citizens of said areas, the President is hereby authorized, by such means or methods as he may deem proper within the limits of appropriations made therefor by Congress, to make such surveys of and general plans for said Tennessee basin and adjoining territory as may be useful to the Congress and to the

* An Address Delivered at the Annual Meeting of the National Council of Geography Teachers, Philadelphia, Pennsylvania, December 26, 1934.

[1] Public—No. 17—73d Congress; H.R. 5081.

several States in guiding and controlling the extent, sequence, and nature of development that may be equitably and economically advanced through the expenditure of public funds, or through the guidance or control of public authority, all for the general purpose of fostering an orderly and proper physical, economic, and social development of said areas; and the President is further authorized in making said surveys and plans to cooperate with the States affected thereby, or subdivisions or agencies of such States, or with cooperative or other organizations, and to make such studies, experiments, or demonstrations as may be necessary and suitable to that end.

Section 23—The President shall from time to time, as the work provided for in the preceding section progresses, recommend to Congress such legislation as he deems proper to carry out the general purposes stated in said section, and for the especial purpose of bringing about in said Tennessee drainage basin and adjoining territory in conformity with said general purposes (1) the maximum amount of flood control; (2) the maximum development of said Tennessee River for navigation purposes; (3) the maximum generation of electric power consistent with flood control and navigation; (4) the proper use of marginal lands; (5) the proper method of reforestation of all lands in said drainage basin suitable for reforestation; and (6) the economic and social well-being of the people living in said river basin.

Rather than set up an independent body whose duty it would be to carry out the provisions of these two sections, the President delegated this duty to the Board of Directors of the Tennessee Valley Authority by an executive order dated June 8, 1933.

As the organization of the Tennessee Valley Authority stands today it consists of twenty-three functional divisions that are directly responsible to the Board thru the Coordination Division. These twenty-three divisions are divided into three functional groups, namely: (1) Management Services, including Personnel, Finance, and the like; (2) Engineering Construction and Operating Services, including Electricity, Engineering and Construction, and Fertilizer; and (3) Planning and Demonstration Services, consisting of the Agricultural Division, the Industry Division, the Land Planning and Housing Division, the Engineering Planning and Geology Division, the Social and Economics Division, and the Forestry Division. The Land Planning and Housing Division, in which the geography work is concentrated, consists of five sections, namely: Geography, Town Planning, Architecture, Recreation and Conservation, and Service and Drafting.

THE MEANING OF REGIONAL PLANNING

Obviously no definition of geography need be offered here. We should, however, consider in some detail the meaning of regional planning. Benton MacKaye, regional planner, Land Planning and Housing Division, approaches the subject by considering first the

question[2] —What is planning? Treating it from four angles he says, first, that *planning is a means to an end.* The point of planning is to attain something and not merely to describe something. Planning must have a purpose, and that implies agreement among those affected as to what it is they want. The architect's plan serves as an example. He does not design a structure without first determining the use to which the structure is to be put, or in other words, the agreed purpose of the occupants.

Second, *planning must be elastic but the end must be steadfast.* We never know what tomorrow may divulge. It may be new resources or new uses of known materials. Change of plans is the life of planning but not change of purpose. The goal must be constant, tho the means of attainment must continuously adjust themselves to varying conditions.

Third, *planning is visualizing.* Planning discovers what nature renders possible. It does not build nature. It builds upon nature. Planning does not produce rainfall or forest growth. It does not contrive. Its beginning is in discovery or visualizing.

Fourth, *the thing planned is movement.* Planning is dynamic and not static. We plan a region not as an inert area but as a sphere of action. We plan the movement or activity going on therein—especially the potential movement capable of going on therein. There are three types of such movement, namely, flow of waters, flow of products, and flow of population. Special purposes apply to each: (1) the flow of waters for the purposes of domestic water supply, irrigation, navigation and power; (2) the flow of products to achieve local self-sufficiency, or local specialization, or some definite balanced combination in between; and (3) the flow of population to achieve a livable and desirable environment—urban or rural.

The purposes of the planning activities of the Authority are defined very specifically by the Tennessee Valley Authority Act. They are the bringing about of:[3] (1) the maximum amount of flood control; (2) the maximum development of said Tennessee River for navigation purposes; (3) the maximum generation of electric power consistent with flood control and navigation; (4) the proper use of marginal lands; (5) the proper method of reforestation; and (6) the economic and social well-being of the people in said river basin.

Benton MacKaye's specifications for planning in general and the Congress' specifications for the purposes of planning in the

[2] In an unpublished memorandum, "What is a Region in Planning," Oct. 8, 1934.

[3] Section 23, Public—No. 17—73d Congress; H.R. 5081, page 13.

Tennessee Valley give us an adequate working knowledge of that phase of the regional planning responsibilities of the Tennessee Valley Authority. With these in mind, let us turn next to the *planning* region. Unfortunately, this question vital to regional planning, seems to have been somewhat avoided by most regional planners and touched upon by a few only very lightly. Fortunately one has treated the subject thoroly.

In an unpublished memorandum dated August 20, 1934, Benton MacKaye describes a planning region as "any portion of it (the Tennessee River Basin) making a convenient physical unit for purposes of working and living."[4] Treating this subject more fully in a memorandum dated October 8, 1934, the same writer traces the region concept thru a series of steps before he brings us to the *planning* region.[5] He speaks first of regions of custom, meaning areas that have been recognized by one or more groups as having the character of regions. He offers as examples the Tennessee River Basin, the New York Milk Zone, and others. These, he says, have in common the qualities of territoriality, of homogeniety in at least one respect, and definite boundaries. On this basis we can say, for the moment that "a region is a homogeneous piece of territory definitely bounded." Most such regions, he holds, are not subjects for the planner.

Next he speaks of spheres of authority, areas set aside by some agency having the authority to do so. Such a body, the Congress, created a sphere of authority in establishing the Tennessee Valley Authority. These spheres, he says, are not things that people habitually call regions, but clearly they are subjects of planning because of delegated authority and specific instructions.

Third, he turns our attention to spheres of influence. An example is the British sphere in the Chinese Yangtze Valley. There are three types of spheres of influence all of which, he submits, are subjects of planning, namely, (1) those based on flow of water, (2) those based on flow of products, and (3) those based on flow of population.

Finally, the writer brings us to the planning region. At this juncture he presents a list of "objects which the regional planner might call regions." Some of the "objects" are: (1) the area of the Tennessee River watershed, (2) the flow of water in the Tennessee River, (3) the flow of hydro-electric power from Muscle

[4] In an unpublished memorandum, "Regional Plan No. 1," Aug. 20, 1934.

[5] In an unpublished memorandum, "What is a Region in Planning," Oct. 8, 1934.

Shoals, (4) the flow of passenger traffic within range of the Lee Highway, and (5) the "backflow" of population from Nashville. He notes four elements common to all. The first is movement; the second is purpose, the purpose being optimum human living; the third common element is movement from a source; and the fourth is unity or integrality; an integral activity or an integral place or sphere of activity.

Bringing his concepts of *planning* and of *planning regions* together Benton MacKaye gives us this definition of regional planning:

> **Regional planning is a comprehensive ordering or visualizing of possible movement, activity, or flow (from source onward) of water, products, and population, within a defined area or sphere, for the purpose of laying therein the physical basis for extending that range of choice which amounts to the good life or optimum human living.**

MAJOR CONTRIBUTIONS OF GEOGRAPHY

The contributions that geography can make to regional planning are too many and too diverse to permit our enumerating and discussing them all. There are four, however, that we should discuss in some detail because of their unique geographic nature and their major importance to regional planning.

First of these is the broad regional perspective peculiar to geography. Benton MacKaye mentions several types of areas that are recognized by one group or another as having the character of regions. He might have added to his list examples from the fields of anthropology, archaeology, bacteriology, physiography, political economy and many others. He states quite definitely that most such regions are not subjects for planning. The reason is evident. The regional perspective of these fields is too narrow.

Regional planning is concerned with one major item, namely, the use of the earth's resources for optimum human living. It is quite clear that regional planning is not planning the use of any one of the earth's resources or the optimum development of any one human activity. Regional planning must be all-embracing in its perspective. If it is not, any plan that is formulated is doomed to become an ill-balanced, unfused mixture of individual interests—agricultural, mining, industrial, and all the rest. As an unfused mixture the attainment of optimum human living is impossible because individual interests, knowingly and unknowingly, push their own desires regardless of the rightful parts other interests should play in the regional whole. Regional planning must do more than merely say that every human interest can function so long as it pro-

motes optimum human living. Regional planning must guarantee that every such human interest is provided the opportunity to function. This approach requires a broader perspective than that of such research fields as chemistry, botany, geology, and agriculture. The perspective which is required for regional planning is essentially the broad "human use" approach that has characterized geography's treatment of regions for many years. Geography sees regions in terms of rounded-out human occupance, that is to say, in terms of a complex, rather than in terms of series of distinct human activities, or series of separate physical settings. No other recognized discipline is so particularly concerned as is geography with the intimate association of peoples in all their activities with the areas they occupy. This approach lays the foundation for a second major concern of geography, namely, the study and understanding of relationships between and among regions. These approaches necessitate an all-embracing regional perspective that is unique to geography. A full application of this perspective to regional planning problems is a major contribution that geography can make.

The second contribution that geography can make to regional planning is the application of sound geographic thinking with regard to the relationships between human activities and their physical settings. This type of thinking is essential to the analysis and understanding of the regional structures involved in regional planning. Expressed in terms familiar to geographers, regional planning is the elimination of maladjustments in the human use of the earth's resources. The regional structures consist of human activities, on the one hand, and the natural elements, on the other. Understanding these structures sufficiently for planning purposes requires thoro familiarity with the cultural complex and the natural complex in all their many individual aspects. With this a part of the planning process, the next step is a thoro understanding of and an appreciation for the inter-relationships between man and nature. The purposes these understandings serve constitute a vital part of the regional planning process. They make possible the formulation of a regional plan that is in keeping with those specific human elements, and natural elements, and the inter-relationships that exist between the two, that properly characterize the region for which the plan is intended. Also, because of the detailed factual background these understandings require, they serve the purpose of objectifying the plan for a specific region so that it can be applied.

The study of the relationships between cultural and natural landscapes has in one form or another been a major concern of geography for many years. The study of these relationships in terms of regional patterns has been a major concern of geography since the early 1900's. Associated with both of these two major tasks has been the discovery and measurement of maladjustments in the human use of the earth's resources. The advent of regional planning into modern affairs has provided an opportunity for the practical application of geographic thought and investigation on a much wider scale than was heretofore possible. This does not mean a change in the specific abilities, habits, and attitudes inherent in geographic thought. They remain the same. Their application to problems of regional planning constitute a second major geographic contribution.

A third major contribution that geography can make to regional planning is an approach that is truly scientific. The need for this is particularly great in the delimiting of planning regions. Decades, if not centuries, of study have been required to set up even the more simple of regions recognized in other fields. Numerous, thoroly tested techniques have been developed in the process. Regional planning can and should utilize those techniques that are applicable to planning regions. The necessity for bringing every technical skill available to bear on this problem is particularly urgent in regional planning because regional planning deals with human values. In order to succeed in its mission of planning for optimum human living, regional planning must be certain that the areas it treats are normal human use units.

Just any portion of the earth's surface will not serve the purposes of regional planning. Regional structures, the framework of human activities, must function normally. What series or combinations of factors will throw the boundaries of a planning region into relief depend upon the nature of the structures that characterize the area. Those series or combinations that serve today may at any time be changed, so that the regional pattern is changed. No rule of thumb procedure can be followed. Under these circumstances rules of procedure must be adjusted, but the principles of procedure must remain the same.

The factors that apply in one case may not, and probably will not, apply to another because no two regions are structurally identical. These circumstances require the continuous application of those qualities that identify the truly scientific approach. Without

this scientific approach, the purposes regional planning seeks to fulfill are jeopardized.

An approach that is truly scientific can not be put on or thrown off like a cloak. It is developed in a science after years of endeavor and after years of constant application. Regional planning appropriately needs the scientific approach of geography. Other sciences treat regional structures, but geography has long since admittedly taken as one of its major functions the study of regions in terms of their human use. It is that specific scientific regional background that regional planning requires and not merely a regional background. It is here that geography can make a third major contribution.

Methods of geographic investigation and presentation constitute a fourth major contribution that geography can make to regional planning. The first principle of regional planning has been agreed upon, namely, optimum human living. Planning for optimum human living means but one thing, namely, planning the uses of a region's resources so that the best in human values can be obtained. Under these circumstances the second principle of regional planning must be to know the resources that are available for use. Unless this principle is adopted, there is absolutely no assurance that the plan formulated will fit the region. This necessitates the collection and thoro treatment of data concerning the following: (1) the resources now being used; (2) how these resources are being used; (3) the resources not now being used; (4) the resources not now being used to capacity; and (5) the present condition of all resources when maladjustments and abuses have been rectified. Relative to the accumulation of these data, Wellington D. Jones has the following to say:[6]

> The regions determined by geographical investigation, however, and the characteristics of regional investigation as pursued by geographers, are different from the regions and the investigations of workers in the other disciplines . . . geographers do something other than investigate in succession the geology, the botany, the zoology, the anthropology, the economics, the sociology, the political science, and the history of a region. . . . On the other hand, if geographers . . . restricted their efforts to making syntheses for regions on which these other studies had already been made by workers in the several disciplines involved, geographical investigation of most regions would be postponed indefinitely.

Briefly, the collection and thoro treatment of these data become the geographer's responsibility because his approach alone is in terms of the human occupance of regions. The data obtained by

[6] Procedures in Investigating Human Occupance of a Region, in *Annals of the Association of American Geographers*, Vol. 24 (1934), pp. 93-111.

workers in other disciplines, since they are not concerned with the same problem, too often can not be fitted into the geographer's regional scheme. Assuming that they could, the problems would still fall in a large part upon the geographer because his treatment of regions could not await the availability of data from these other disciplines.

The procedures applied by modern American geographers in their investigation of the human occupance of regions have been subjected to a continuous program of intense criticism, examination, experimentation and countless applications. Their worth to regional planning can not legitimately be questioned. It is safe to say that unless the full use of all these firmly established procedures of investigating and presenting the human occupance of regions is made, the success of regional planning will be seriously jeopardized. If the development of separate procedures is attempted the establishment of regional planning as an accepted principle will be greatly retarded.

These then are four major contributions that geography can make to regional planning: (1) geography's broad regional perspective; (2) sound thinking with regard to the relationships between human activities and their physical settings; (3) geography's scientific approach; and (4) methods and techniques of geographic investigation and presentation.

FACTORS IN THE RECOGNITION OF GEOGRAPHY*

Is geography making these and other contributions? In a number of instances, it is. But with regard to the present regional planning work going on in the United States as a whole, it is not. It might be interesting to enumerate some reasons. First, few men in geography are in a position to give time to this type of work. Their major obligations are, from necessity, concerned with teaching rather than research. Second, the number of men trained in modern geograpic techniques is relatively limited. And, third, the methods, techniques, and contributions of geography are not fully known by the general public.

The major factors lying back of this situation are three. One is the type of training that characterizes courses in geography from the lower levels upward. Professor Harlan H. Barrows says: "Why is geography, though potentially so important, neglected or ineffec-

* There has been considerable increase in the recognition of geography's contributions to regional planning since this paper was prepared in November, 1934. Author.

tively used in countless connections where it might function helpfully? Faulty geographic training, especially at the earlier levels, is, I think, largely responsible for the situation.'"[7]

A second factor is the strict adherence of geographic research to the principles of scientific method. The geographer has been forced by the dictates of his scientific approach to know first the thing with which he deals, namely, the region. The thought of evolving any plan, any improvement, or any change whatsoever was maintained only in the background as a motivating force while he set about the task first of developing and perfecting techniques of investigation, analysis, interpretation, and presentation. This task is of a highly professional nature. It is comparable to the years of laboratory work that precede the brief, and often undramatic public announcement of a discovery in chemistry, or medicine. Geographers do not contemplate changing their scientific approach or making a great public announcement, but an appropriate time has come in the history of their science and in the affairs of the day for them to devote a greater share of their skills to wider public uses.

The scientific discipline under which geographers work has hindered in another way the full use of geographic skills and has thus kept a full knowledge of geography's contributions from the public. On occasion one agency or another has turned to the geographer for solutions to problems that were rightly thought to be primarily geographic. In the treatment of such problems, the geographer refuses to be hurried into making statements that might be misunderstood as being final and conclusive. He refuses to approve plans or promise results until he has sufficient reliable evidence to satisfy him that his position is invulnerable. Far too often agencies seeking assistance become impatient and turn to some one with a ready answer, unaware of the complexities of geographic problems and the long weeks of preliminary "laboratory" work that must be completed. Sometimes programs that would have solved the difficulty have been forsaken and problems have gone unsolved. Other times, more unfortunately, substitute programs from elsewhere have been utilized with the disastrous results of making a bad situation worse. Agencies dealing with geographic problems, particularly those concerning regional human use structures, must realize that every regional structure has characteristics peculiar to itself

[7] Geography and the Individual, *The Ohio State University Bulletin*, Vol. 35, No. 3, Sept. 15, 1930, p. 238.

and that the geographer must, therefore, approach each problem from the standpoint of strict, scientific experimentation. Under these circumstances the geographer can not be expected to state in complete detailed form the procedure he will follow as it applies to specific problems. Neither can he be rightfully expected to state in advance the specific results he is sure to obtain.

The third factor is the extreme complexities inherent in the human occupance structures of regions. Having begun his work with the study of regions, *per se,* no one is in a better position than the geographer fully to appreciate how truly complicated are these regional structures. The familiarity with these structures developed over years of study gives the geographer a unique perspective that enables him to see the complexities not as a jumbled mass of inextricable items, but as an understandable structural mosaic. Seeing them in this light enables him to go thru the long, painstaking task of extracting one by one, and in appropriate combinations, the items that constitute the structures. This skill enables him to see each factor in its proper light, and to see the subtle relationships that are present. It is then, and only then, that the geographer is in a position to measure the efficacy of present regional structures and to plan programs of reconstruction that aim at the elimination of maladjustments. These points must be remembered; from beginning to end the procedures must move slowly; in some instances attacks must be abandoned because they are found to be inappropriate; and the entire procedure must be looked upon with utmost patience and confidence.

The advent of true regional planning into modern society is the placing of human values first. It is the application of the principle that true values are not measured wholly in terms of costs and profits. Geography has a wealth of contributions to make and the time has arrived for geography to make these contributions. We must remember, however, two important things; namely, as we devote more of our skills to public use we must be increasingly critical of all that we do, and we must not forsake the frontier of geographic research because of the opportunity to participate more widely on the frontier of social and economic improvement.

PRACTICAL GEOGRAPHY IN THE HIGH SCHOOL*

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Geographers have, from the earliest times been very practical people. They have always been "doers" and usually have been adventurers. Yet it is a rare geography classroom that gives even a pale reflection of this pioneering spirit. My intention is to outline some of the reasons why I believe that our work in schools would be more attractive and more effective if it were to be more practical.

Much school work, and this applies to many departments of it, is a failure because of the roots from which our educational system has sprung. The academic approach to learning—the way of the book, the eye and the ear—is an inheritance from the days of Monastery schools. They were intended to produce clerks, clergymen and bookkeepers. Practical people did not go to school, they were apprenticed. They learned by doing. The old bookish ways were doubtless suitable for the things needing to be learned in schools. Yet in the past fifty years new bodies of knowledge have become important. Only with the greatest difficulty have the schools been able to modify their methods to take in the sciences and the laboratories without which they are meaningless. Geography has been less successful. It has managed to fight its way into some schools, but often at the cost of becoming an academic study. It has been transformed from the study of the great outdoors, into a poring over pages, or at most the drawing of often rather meaningless maps. Students incline to classify it with history and grammar or latin subjects which are all too easily taught in a dry-as-dust manner. This is particularly unfortunate, not only for the prestige of geography but for the students themselves, because to very many of them the way of the book and the eye is a hard way of learning. Many learn more readily and understand more fully if the hand and the eye are trained in cooperation with the intellectual faculties.

* Presented at the New York meeting of the National Council of Geography Teachers, December, 1941.

Fortunately geography is particularly fitted for being handled practically in the schools. Like the sciences it is best approached by means of things that can be done. While the school sciences are tied rather tightly to the laboratory for their practical work, the geographer has no such limitations. Anywhere within range of the students serves as a laboratory. Good work cannot be done without the expenditure of a good deal of shoe leather, especially in these days of rationed gasoline. So the geography teacher is greatly aided by two methods. The classes must be taken out of doors where physical, economic and social facts can be studied on the spot; and there must be laboratory study taking as important a place as it does in chemistry, physics or biology. These methods force the teacher to keep his feet on the ground and to do without the billowing clouds of talk and chalk that accompany so much of our teaching. Continual reference to things which the students *know* to be true is one of the few ways by which geography may be kept *real* thruout the school course. While most of the outdoor work will have to be done in the short periods usually devoted to the subject, it is often possible to arrange for half-day excursions and occasionally for longer ones. Much of the actual work must and should be done out of doors, or to use the modern term "on location," but there is a great deal which can be carried on in the laboratory or workroom by the students. Such work is not to be regarded as a decorative trimming to be added as needed to a normally academic course. It is part and parcel of it. The atmosphere of the geography laboratory is less that of a classroom than a workshop. This kind of work, if it is to be any good, needs a great deal of space for the students to move about in and space in which to exhibit or store the variety of equipment that a teacher of geography gathers around himself. In many schools the struggle for "Lebensraum" is almost as acute as in central Europe. We on this continent have been far behind our colleagues in Great Britain in asking for and securing properly equipped Geography Rooms. Our own organization might consider the value of urging the need for such rooms on the various educational authorities. Once a special room has been secured, the desks torn out of it, its neat and scoured appearance marred by maps, diagrams, charts and apparatus few need to be convinced that what goes on in there is worth doing.

Apart from the need for equipment and space the geography teacher needs time. Practical methods of instruction are always

slower than lecture and book methods, but they are also of more permanent use. Where lack of time forces a compromise, essential parts of the work should be handled practically and those less essential in a more superficial way. For this and other reasons, it is impossible to lay down a uniform policy to be followed. In selecting the work to be done local conditions must be borne in mind. Rural schools and urban schools naturally emphasize different work.

Furthermore a great deal depends on the thoroness with which geography has been taught in the lower grades. It is essential I believe not to assume knowledge of the elementary work simply because a student is in a senior high school. Nothing is to be gained by attempting to carry on advanced studies until students have a knowledge of the principles of climate, relief, vegetation and so on. The aspects of geography which are to be treated practically will also vary with the experience and knowledge of the teacher. What follows is a summary of the type of work which has been done at various times and in various places by the writer.

1. Map-making, map reading, both of local areas and of distant places leading to the use of atlas and other maps.

2. Mathematical geography which may include rough determinations of latitude and longitude, time zones, use of model instruments, measurement of distances by degrees and miles on the globe, and in some cases projections, elements of air navigation and "great circle" routes.

3. Recording of the local weather for long periods, making as complete a record as possible, and keeping the data in the form of graphs. Use of these data to learn the meaning of such terms as monthly mean, annual range. To understand climates of other world regions by comparison with local data.

4. Study of land surfaces from local examples out of doors and from miniature examples or the playground. Making and use of models of the local area.

5. Comprehensive study of the local region. This combines in one undertaking a variety of practical work.

Of these five examples two are chosen to receive more detailed attention here. They are "The making and use of maps" and "The study of the local region."

MAPS

About twenty years ago a committee of the London County Council instructed its teachers that all geography students should

"acquire a thoro knowledge of maps, their kinds, uses and manufacture." If teachers of geography had done nothing more than this in the past two decades, and had done it thoroly, today's adults would have good cause to rise up and call them blessed. The proper understanding and use of maps is at the root of all geographical work. Yet there is no part of our work that is less thoroly done. I have for many years tried different methods of inducing students to look not *at* a map but *thru* it to the reality behind. Just as a reader does not see the letters C A T as a group of rather strange lines but as a symbol for a kind of animal, so it should be possible for a pupil to look at a map showing, shall we say, the district in which he lives and see something more than lines, symbols and coloring. I have tried to do it by using aeroplane photographs. The photograph routine is well known. This is how it is done. An oblique air view of a place well known to the class is obtained and each of the students studies it and recognizes places on it, if possible the school or some other local landmark. There is no question in their minds but that the view is genuine and represents what could be seen by anyone in a plane. There is no unreality about it. Then a vertical aeroplane view of the region is secured and compared with the oblique. The students make a map from this view, showing main streets and chief buildings and get the scale by actual determination on the ground of the distance between two points on the view. They then have a generalized map taken directly from the original view. If this is done once or twice it is soon possible for students to recognize the real nature of a map. Variations are possible by using air views of unknown places and then making maps from them. Then a map of the school area that was made before aeroplanes existed and which is demonstrably also accurate is shown. Methods that could have been used in making it are then discussed. The students realize that altho everything is shown in a picture, there has to be a selection in the case of the map. They recognize that the selecting is done by the map maker. A map should always have a title such as "Map of New York Showing Main Streets." There is no such thing as a map of Manitoba or of New York State. Selection comes in and the greater the area covered the more the selection that has been done and the greater the omissions. As the area to be mapped increases it is impossible to draw objects to scale and symbols have to be invented. The attempt is to make this change so naturally that when the symbol for, for example, a quarry is seen,

the student thinks of a quarry and not of a couple of crossed hammers. This work can only be done slowly and if it is not thoro it is a waste of time. It should preferably be done in the lower grades. I have done it successfully in grades six and seven. From their own modest efforts the students realize that making a map of even the home state is a colossal undertaking and can only give a very approximate result and that a map of a country like Canada or the United States is bound to be rather rough and ready and is always open to correction and improvement. They realize, often for the first time, that maps of large areas can only be constructed from the work of countless persons in small areas.

To supplement this work it is useful to give students some practice in making maps without the aid of photographs. This is begun by a map of the room, of the playground or of part of a nearby park. There is room here for teamwork by dividing the job among small groups, the final map being fitted together for exhibition. Accuracy will depend on the methods followed. Simple instruments such as a tape and chain and some form of angle-measurer are the minimum, altho pacing is suitable for longer distances. Students gain accurate impressions of what is meant by "a hundred yards," or "a quarter of a mile," or a height of say "sixty feet." Without such work few of them have an idea of distances so that map reading is largely meaningless to them. The principles of triangulation may be brought in. Many schools have been able to carry out simple levelling and so put in contours on their maps. Without some practical examples contours are exceedingly hard to understand, and the time taken in contouring the corner of a playground is usually worth while. Altho it is encouraging to be able to exhibit a beautifully finished map of a part of the school grounds, there is no need for this. The students learn from the collecting of the data, and the artistry needed to make a good map may well be beyond some of them. Some schools have found that students learn from making relief models either on a sand table or more permanently, to show the region that has been mapped in scale. If local conditions prevent continuous outdoor work, model making from existing maps is a useful substitute. Their use is increased if the model is small enough to be taken out-of-doors for comparison with the actual region. That is to say it is better to make a model of part of a park which the students can see, than a part of the State which is both too large to see at once and is also out of reach.

THE LOCAL REGION

Practical geography reaches its climax in the study of the local region. Such work converts the student's existing knowledge of his home area into the "geographical language" which he needs to understand what has been written of other places. He is given a yardstick with which to measure the world. It impresses on him the variety of ways in which people make a living within even a small area, and so shows the immense complexity of life in the whole world. From it comes first hand experience of the varied character of the land surface and of the uses to which it may be put. Finally, an intimate knowledge of local conditions shows pupils the types of employment open to them when they leave school. It is a form of vocational guidance.

The limit to what may be done depends on the ability of the students, and on local conditions. The simplest form of the work in a large city is to record on printed maps some type of distribution, it may be drug stores or banks, churches or schools. The aim in this case is less to make a map of permanent value than to give the students experience in recording data on maps. From such simple beginnings more comprehensive local surveys may develop in which the cooperation of other school instructors may be invited. There is ample room here for collaboration between history and geography teachers together with those responsible for art and craft work. Examples of a local survey will serve as an illustration of how the work is done. The area to be covered should be that which is available for direct observation by the pupils. Large scale maps are needed on which to plot results. In western regions provision of local maps is simple because of the use of sections and townships in surveying. The writing of long reports should be discouraged, and anything that cannot be recorded as a map or diagram should be suspect. Committees may be set up to take charge of portions of the work. For example relief, in the form of maps or models, should be looked after by one group. Others may seek to discover the appearance of the countryside before it was settled by white men. The story of settlement forms another useful piece of committee work, information being secured wherever possible by interviews with old settlers. This leads to a chapter on the present distribution of population. The use of the land next follows. Detailed mapping of the land is possible either by students recording the use near their homes on a large map kept in the school, or

by special journeys made with map in hand. A record of the disposal of agricultural produce, what is sent out of the area, when it is shipped, approximately how much and what happens to it is valuable. This can be regarded as analogous to the exports of a country. Then follows naturally a survey of transportation, any routes crossing the area and where they go to. Finally the occupation of persons in any small communities within the region and the ways in which they are dependent on and supply the rural people. The results of such a survey should be in a form which can be easily exhibited and kept for later use. They should be regarded as a sort of Domesday Book of the locality and could be repeated from time to time. Where possible the work of neighboring rural communities can be linked up, particularly in the matter of land-use mapping.

In a city, the work will be of a different nature and there may be more room for the introduction of "civics" and details of government. The place of land utilization is taken by distribution of industries, and maps of population are not possible except of small districts. Newer cities offer scope for correlation with work in history.

Enough has been said to show that there is no lack of practical work to be done. It is important to keep in mind thruout that the object of the work is less to produce a finished job, than to give students personal experience of the sort of things they read of in their geography texts from other parts of the world.

CONCLUSION

Geography as a profession is, and always has been, a practical business. The best geographers have always been doers, travellers and explorers. Practical work removes the subject from among the book studies which are so unpopular in schools. It provides yardsticks by which students may measure information about distant places that they have to secure from the printed word and from maps. It is the best way of instructing the non-academically-minded students. It supplies an excellent basis for correlation with other subjects, not only with history and civics but with arts, craftwork and so on. The students can see their own work growing under their hands and know something of the pride of the craftsman in work well done. It converts the classroom—a place of desks and blackboards—into a workshop where things happen. Gone is the daily round of reading, listening and writing. Gone is the need for routine, dry-as-dust memorization of matter which is not fully under-

stood. Geography is revealed as a matter of day to day interest, of obvious value and of world wide importance.

MODERN GEOGRAPHY AND CURRENT EVENTS

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Modern geography admittedly is concerned with the study of ephemeral relationships existing between human activities and the natural environment. These geographic relationships are transitory because they represent an amalgamation of two variable factors—man and nature. The evolution and the inconstancy of man are too well known to require illustration, but sometimes even geographers are prone to ascribe an unwarranted degree of stability to the major elements of man's natural environment. From the point of view of the physical sciences individual earthquakes, volcanic eruptions, forest fires, or wind storms have only microscopic significance; from the geographical point of view, however, these and other small changes in the fundament assume major importance because of their profound effects on human life. Clearly, then, the progressive geographer must make careful and discriminating use of current events.

APPROPRIATE CURRENT EVENTS

Current events vary from the Dionne quintuplets to the Einstein Theory, both of which are equally unintelligible to the average reader. As geographers we fortunately are able to restrict ourselves to those comparatively few current events having a high degree of that priceless ingredient, geographic quality. To have well-marked geographic quality a news item must show a close and fairly direct relationship between human activity and the natural environment. With an adequate amount of supposing, twisting, and warping most current events can be shown to have some geographical basis, but teachers of geography usually should be concerned only with good clear-cut examples.

Geographers have but little use for many current events which to the uninitiated might appear valuable. The much publicized Byrd Expeditions seem to be of considerable interest altho their contributions to geography are small indeed. One is reminded of a story about the Expedition's need for four ships—the huge factory whaler

C. A. Larson to move the vast quantities of equipment and "advertized brand" supplies, the *City of New York* to carry the extensive personnel, the *Eleanor Bolling* to transport the reams of press releases, and lastly a canoe to bring back the scientific findings. Stratosphere flights to a point more than thirteen and a half miles above the surface of the earth probably are useful, but of course many sounding balloons have ascended to far greater heights. According to a recent newspaper story some pictures taken on the recent Army-National Geographic balloon flight indicate that the earth is round; this fact, altho of undoubted interest to geographers, hardly can be classed as a current event. It also is likely that Mr. William Beebe's daring descents in his bathysphere to previously unseen depths of the sea are of less geographic value than are his masterful descriptions in "Jungle Peace."

Two groups can be recognized among the many current events especially appropriate for use by geographers. These are technical current events, and general current events. Technical current events are those articles written by geographers about geographical problems which appear in our professional journals such as the *Journal of Geography,* the *Annals of The Association of American Geographers, Economic Geography,* the *Bulletin of the Geographical Society of Philadelphia,* the *Geographical Review, University of California Publications in Geography,* and certain foreign geographical magazines. The value of these publications to geographers is self evident. One pertinent conclusion also admits no dispute. Professional geographers either must be research workers helping push back the borders of geographical knowledge or drones thriving on the industry of their productive colleagues. General current events include the broad range of subjects found in such sources as *Time,* the *Literary Digest, Science,* the Sunday *New York Times,* and local newspapers. Because general current events have less obvious geographical significance than do technical current events, the following paragraphs are concerned with methods of adapting general current events for use by teachers of geography.

ILLUSTRATIONS OF BASIC PRINCIPLES

Current events are useful as up-to-date examples of those elementary geographical principles stressed in introductory courses. A few unit examples taken from recent world happenings will demonstrate this technique.

The causes of day and night as well as the effects of these phenomena on human activity always have a place in elementary geography. We point out the diurnal rhythm of man's activities, the variations in length of day depending on latitude and upon season, and the typical fluctuation of a family electric bill. How much more life can be injected into this subject if the teacher refers to that bit of Ethiopian strategy in which the dusky warriors removed their flowing white robes to make a successful midnight attack on an Italian outpost.

Students often are reluctant to thoroly understand the mysteries of standard time belts and the International Date Line. Experience shows that a problem or two based on the magnificent flight of the China Clipper is of more practical value to the class than is an hour of lecture on meridians and chronometers.

The destructive power and unpredictable routes of tropical hurricanes have a natural student appeal. All teachers refer to the disaster at Haiphong, Indo-China, in 1881 when some 300,000 people were killed by an East Indian typhoon. We also call attention to the devastation at Galveston when in 1900 a hurricane swept in from the Gulf of Mexico with sufficient force to kill 6,000 people and destroy property valued at $30,000,000. Last fall, however, students were particularly interested in the much discussed hurricane predicted for Nassau, Bahama Islands, but which by some freak of nature blasted Miami instead. The plight of the steamship *Dixie* forced on the Florida Keys by a hurricane also leads to a consideration of the recently announced trans-Florida ship canal.

Important in all beginning geography courses is an appreciation of the intensity of the sun's vertical rays. Teachers usually suggest that the generous use of air conditioning equipment might make the tropical lands more suitable for white occupance. We also should be aware of experiments just completed by Dr. Crowden of the London School of Hygiene and Tropical Medicine who announces that a piece of aluminum foil used as a hat lining will reduce the temperature felt by the wearer as much as twenty degrees, and that corresponding reductions in temperature can be achieved by lining tent or house roofs with aluminum foil.

Most geographers are concerned with examples of relationships between weather conditions and human behavior. A classic example is the increase in murders reported in Italy during periods when the hot, dry sirocco wind blows desert air across the Mediterranean. It is said that crimes committed when the sirocco pre-

vails commonly are punished less severely because judges recognize the nervous tension caused by this hot wind. As a current example of this relationship we can refer to the recent statement by America's number one "G" man, J. Edgar Hoover, that his reports show a distinct increase in crimes of violence during hot weather.

Difficulty of mountain transportation is one of the most emphasized features of human activities as related to landform. Frequently instructors discuss the fact that in parts of Bolivia the llamas still are able to compete with railroads in transporting ore from mines to mills. Interestingly enough the commercial use of pack animals is not confined to distant lands in far away continents. This winter in Los Angeles County, just outside the city limits of Pasadena, mules are being used to carry poles for a new telephone line being built to Mount Lowe, a resort in the San Gabriel Mountains.

Without question current events can be considered one of the geography teacher's valuable instructional aids. We should, never-the-less, resist the temptation to use news items unless sober reflection shows them to be especially appropriate. Overemphasis of interesting current events may cause the students' attention to shift from the basic principle to the illustrations of that principle. Here as elsewhere a sane and well balanced moderation is essential for success.

CONTRIBUTIONS TO GENERAL EDUCATION

At all times we should remember that we are educators as well as geographers. Geography is taught as one element in preparing students for more interesting, useful, and profitable lives. From this point of view it appears that some consideration of the geographical factors in major world events constitutes a contribution toward general education. In our work at Los Angeles Junior College, for example, we have from time to time given attention to developments in the Italo-Ethiopian situation. Such discussions, in addition to adding zest to the course, broaden the students' present point of view and show by example how geography can be of value in later life. Our experience suggests that general treatment of this or some similar large, complex problem of world affairs is especially useful late in introductory courses as a vehicle for reviewing a variety of those principles already developed. In all analysis of this type the instructor of course must confine himself chiefly to the geographical factors and avoid floundering in a maze of purely economic or political detail.

OPPORTUNITIES IN ADVANCED COURSES

Advanced courses in geography offer special opportunities for the use of current events. There are two major reasons for this situation—advanced work is much more intensive, and the students already have much necessary background.

All the wide variety of upper division courses given by four-year institutions afford particular opportunities to make current events function as a valuable geographical teaching aid. Comparatively detailed items about the accomplishments and problems of specific countries have a definite place in our regional courses. Reports about the drainage of the Pontine Marshes, the expansion of the Japanese textile industry, the growing citrus exports of Palestine, and Brazil's new attention to cotton growing probably would not be useful in introductory classes, but they all are suitable topics for appropriate upper division courses.

Not a few of our larger colleges and universities have one or more courses in political geography. Current events, especially those concerned with territorial and boundary disputes, here form the major basis for a semester's work. Specific study can be made of the geographical factors entering into the Gran Chaco dispute, the question of Philippine independence, Cuban and Mexican revolutions, Sino-Japanese relations, and the Italian-Ethiopian war. Students in these political geography classes commonly are mature enough to appreciate that, while geography is only one of the elements contributing to an understanding of these problems, the geographical factor is fundamental and worthy of careful study.

GEOGRAPHY AS A DYNAMIC FORCE

It is a source of much gratification to all geographers to realize that recently geography has begun to emerge from its passive role as an interpreter of current events and to wield influence as an active force in their formulation. Economists, engineers, political scientists, and others of our colleagues long have had a voice in high governmental and business councils. The emergence of geography from the ivory towers of our colleges and universities dates only from the World War. During that period many geographers made valuable technical contributions toward national safety while in government service. At the close of the War Dr. Isaiah Bowman and his colleagues of the American Geographical Society contributed a body of material for use by President Wilson at the

peace conference. It is probable that some of Europe's sore spots would not now exist had the recommendations of these able geographers been more heeded.

Between the War and the advent of the New Deal geography made but slow progress outside the classroom, altho the general position of our science was vastly strengthened by the introduction and the expansion of geography departments in all parts of the nation. Regardless of its faults of omission or commission the Roosevelt administration has given geography its greatest opportunity for public service and recognition. Enough trained geographers to staff three or four large departments recently have been appointed to positions with the National Resources Committee, the Tennessee Valley Authority, the Soil Conservation Service, the Bureau of the Census, and various State Planning Boards. Perhaps all of these appointments do not represent permanent net gains, but at any rate geography is being given an opportunity to demonstrate itself as a peer of older and better established disciplines.

PART TWO

GENERAL TECHNIQUES

Teaching techniques should receive more attention in the high school. Too often the high school teacher takes for granted that the student has acquired the ability to use effectively such tools as maps, pictures, and graphs; that he can read the landscape, and also that he has the background and ability to read geographic materials. Unfortunately, this assumption is false. There is a wide variation in the geographic training that children receive in the elementary school; consequently the high school teacher finds a wide variation in the types of background that his students bring to the study of geography in the high school. The teacher needs to know his students' background and the degree of skill they have acquired in the use of such tools as maps, pictures, graphs, and reading.

The ability to secure facts and to make inferences from maps, pictures, landscapes, graphs, statistical tables, and also textual materials is vital if the student is to become an independent worker and continue to learn after leaving high school. He cannot think geographically unless he can use such tools. Facility in the use of such geographic tools is necessary if he is to understand newspaper and magazine articles and radio discussions of current topics. The teacher should seek to discover the students' level of attainment in the use of these tools either by formal tests or informal checking. Then he can plan the students' activities so that the student will gain increased facility. Some students may be unable to use latitude and longitude or even may not know the meaning of the terms. Others cannot visualize what the colors on a physical map indicate. If the teacher discovers such weaknesses early, he can make provision for correction as he develops the units with his class.

A variety of techniques should be used in motivating or introducing a unit, during the development of the unit, and for summarizing and application exercises.

MAKING THE TEACHING OF GEOGRAPHY EFFECTIVE*

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In geography work we are more fortunate than workers in most sciences in that we always have our laboratory with us. I happen to be teaching now in northeastern Ohio and have Akron, a busy manufacturing city, almost at my front door. Its crowded streets, its tall buildings in the down town district, its huge rubber factories, its factory residential districts, as well as its sections with estate-like homes, provide me with a very fascinating laboratory in which to work. I shall draw upon this laboratory for my examples.

In all my experience with pupils in the grades, in the junior high school, and in college classes, I have found three guide posts of great help to me in making my geography teaching effective.

Importance of Reality in Effective Teaching

I like to think of the first guide post as carrying just one word, *reality.* If I can make the region or place we are studying as real to my pupils as the places and people they see every day, then one of my major problems as a teacher has been solved. What are these things which must be made real and how do I accomplish this phase of the work? Of course, before I can hope to make the things in the landscape, both man made and natural, real to my pupils, they must be real to me. I must prepare myself for my teaching by first visualizing the outstanding cultural or man made characteristics and the natural features and conditions of any region or area I wish to present to my pupils. For example, if the study of Akron is to be made real, I must see in Akron a city with crowded streets, tall buildings, and many factories. I must see many of these factories as a special kind of factory, namely those in which the manufacture of rubber is dominant. Airplane pictures of Akron might supply me with these data and help me to visualize the city just as I can actually do in field work of a reconnaisance type.

Significance of Discovering Reasons

On my second guide post is another single word, *reasons.* Similarly, if I wish to guide my pupils to find the reasons for the

* Presented before the Geography Section, Wisconsin Education Association, November 6, 1936.

ways of living and the kinds of work people are doing in the lands they study, I must myself first discover such reasons. For example, when I find out that there are twenty large rubber factories in Akron in which every form of rubber from rubber bands to balloons and dirigibles is made; where 125,000 automobile tires are made daily; and in which a large share of the workers of Akron are employed, I search to discover facts which will help to explain why Akron is the great rubber center of the United States. There are always three types of factors which I investigate to help solve my problems. These are first, the factors of the natural environment, second, factors in the cultural environment and third, factors that have to do with the nature of the people themselves, their insights, abilities, and attitudes.

To answer why Akron is the rubber center of our country, I investigate the natural setting which men had to use to develop the city. Akron is in northeastern Ohio between the Cuyahoga River which drains to Lake Erie and the Muskingum draining to the Ohio. There was a gap in the water route here which handicapped direct water transport from the Ohio River to the Lake. To overcome this handicap men constructed the Ohio Canal so that this cultural environmental factor, the canal, was added to the natural setting, which included likewise falls in the Cuyahoga River which could be used for power. Factories in the town used native clays from nearby deposits making bricks and other clay products. The fertile farmlands nearby furnished oats and other grains for the mills which made use of the power from the falls. The Canal was used to bring in coal from the Appalachian coal fields not far away—another factor in the natural environment. Then railroads, a cultural environmental factor, followed the route of the canal, and Akron had three main railroads to give it excellent rail connections. The insight of Dr. B. F. Goodrich helped him in 1869 to decide on Akron as the place to erect his rubber plant which he wanted somewhere west of the Appalachian Mountains. In Akron he found the people who could and would help him with the money he needed to build his factory. Thus another cultural environmental factor enters into the interpretation—the capital available. Of course, the process of vulcanization had already been discovered by Charles Goodyear—still another cultural environmental factor. At first bicycle tires, heels, soles, beltings for machinery and other rubber products were manufactured. Other concerns located in Akron as often happens after someone has made a successful start. It was not until the decade 1910 to 1920, however, that the big change took place. In this

period, the population tripled and the wage earners in factories went from almost 16,000 to 65,000. The cultural environmental factor that helps to explain this change was the demand for tires for the rapidly growing automobile industry. Akron has the natural advantage of not being far from the heart of the automobile industry. Taking into consideration the advantages of its railroad connections and of the nearby deposits of coal from the Appalachian coal fields as well as such local advantages as plentiful supplies of clear water from many fresh water lakes near the city, we can see some reasons why Akron, with its early start in the rubber industry, is the great rubber center of this country. This brings out the three types of factors mentioned earlier. The nearby deposits of coal, the fresh water lakes, the falls, the gap between the rivers are factors in the natural environment. The railroad connections, the capital, the invention of vulcanization, the canals, are samples of cultural environmental factors. Whereas the insight of Dr. Goodrich and of those who helped him typify the importance of consideration of the nature of the people in the development of this industry. In order to find these reasons I had to investigate many sources but it is an example of the preparation which I must make before I can hope to guide pupils to find reasons. In many cases the maps, pictures, statistics, and reading matter in our textbooks contain these facts and we do not need to do the type of research and investigation ourselves which is represented in the above findings about Akron.

CONSIDERATION OF BACKGROUND OF PUPILS

Thus far, I have spoken only about my preparation for guiding pupils to think geographically. Without such preparation, however, I have found that I can not do effective teaching whether it be at the fourth grade level or in college. Before I speak more about how to guide the pupils I need to, myself, follow the directions on my third guide post which says, *background*. I must know the past experiences of my pupils before I can direct their activities. I must know what map reading abilities they have, what landscape reading abilities, what technical and semi-technical language reading abilities they have, what ability they have to reason in terms of given geographical ideas and understandings, and what ability they have to apply such ideas in coping with new situations in every day living, and whether they have acquired the habit of so doing. This

may sound rather formidable. It is not, however, for our guidance means to introduce these informally. A beginning fourth grade child does not possess any of these abilities and could not be expected to discover the reasons by himself, presented in the little study of Akron. His background for such reasoning must be developed gradually. Our guidance should help pupils to gain these various abilities thru providing experiences which will help them to become more and more independent in their use of the various tools at their disposal. I have found in my college teaching that my pupils do not have the landscape and map reading abilities which they need to do effective geographical thinking. A population map is something which they look at but do not read thru to the actual landscape. Therefore they need experiences which will make this map real. When the population map shows that the region of rainy tropical climate has from less than one, or from one to eight, or from eight to sixteen people to the square mile, we translate these facts into number of houses per square mile. Before this takes on real meaning, we need to have a square mile in mind. Our school campus covers approximately 100 acres and when we think of almost 6½ times that area without a single habitation or with 2, or at most, 4 houses on it, we get a real feeling of sparse population. By such experiences we supply that part of the background which earlier experiences had not given. Similarly we can not understand, in these college classes, what it means for this rainy tropical climate to have 80 to 100 inches of rainfall annually, if rainfall has not been made real to us. When I ask these college students how much rainfall we have in a year in northeastern Ohio, they either have no idea or vary in their ideas from 10 inches to 100 inches. "How much rain falls here in a single shower?" is another question they can not answer. These college students differ in their ideas from less than an inch to six inches for one shower. These students have never had the experience of putting out a tomato can or other straight sided vessel and themselves measuring the rain that fell in a particular period, that is rainfall has never been made real to them. When the rainfall of their home region which they have experienced is expressed in terms of distributions and amount, they have a sort of measuring stick to use to help visualize the rainfall of other regions by comparison and contrast.

I have spoken thus far only about my own preparation for teaching, first how I make the region real to myself and second,

the reasons for the outstanding cultural characteristics of the region. The third consideration which is really a part of my preparation is knowing the background of my pupils.

BACKGROUND OF JUNIOR HIGH SCHOOL PUPILS

This consideration of the background of my pupils brings me to the subject of the junior high school work. What is the background of junior high school pupils? Of course this varies from place to place depending on the work of the elementary school. If the work of the elementary school has been successful, we might expect our junior high school pupils to have some of each one of the five abilities mentioned earlier.

They should be able to use all types of semi-pictorial map symbols, as well as the more abstract symbols such as those on color band, dot and spot maps. This means that they would be able to use all types of maps except iso-line maps such as contour maps, those using isotherms, isohyots, isopleths. They would be able to read practically all cultural and natural landscape features since their study would have taken them into all countries of the world where they would have seen the various types of land uses. There will be some technical and semi-technical terms which they may need to add to their language reading abilities such as alluvial fans, balance of trade, and a few others. They will have some ability to reason in terms of geographical understandings and to apply these ideas to every day living. For example the 7th grade boy who criticised the statement, "The sea has made Britain famous," by saying, "To give the sea all the credit while coal and man step aside isn't fair" showed that he could think in terms of geographical ideas and would be able to apply this type of thinking in his reactions to such everyday problems as the Great Lakes Waterway. This statement about the sea was taken from a senator's argument for that project.

PRESENTATION SUGGESTIONS

Many of our pupils come to junior high school without these abilities. Therefore the junior high school teacher's problem is to provide activities which will make up for the lack of earlier experiences along this line. This does not mean that the same materials should be presented to junior high schools pupils as to those in the elementary school but it does mean that the junior high school teacher must take special pains to provide for the reality and

reasons guide posts. In most of the seventh grades in junior high school the work consists of the study of certain political regions completing the cycle of regional study. In the eighth grade, however, and in the ninth or later senior high school work the geography work generally trys to develop understandings of world distributions. Before briefly sketching a blue print lesson plan of this second type of junior high school or high school unit, I might state a few guiding rules for presentation. First, since all teaching is guidance, the teacher's task is to provide for activities thru the exercises which she sets up. Some of our books do that for us. Where that is missing the teacher may be helped by the following suggestions. In the initial exercises, direct the attention of the pupils to the outstanding cultural characteristics of the region or of the pattern of distribution to be presented. If these outstanding cultural characteristics are brought out sharply, they should arouse the pupils to asking "why" questions or setting the goal for study. When the goal has been set and the pupils know what it is they are going to do, the teacher must provide both the exercises and materials for the work to continue. The text usually supplies all the materials, to be sure sometimes widely scattered. The teacher who in her own preparation has found reasons for the outstanding cultural characteristics knows to just what maps, pictures, grafs, reading matter, etc., in the text, to direct her pupils. She needs only to set up an exercise or exercises by which the pupils themselves will discover what she knows will help solve their problems. To expect children to search thru a great mass of material first in one source and then in another, perhaps materials very much alike, is, in my opinion, a very wasteful process. If the particular text does not contain the material needed, the teacher will find it not only time saving but also more satisfactory if each member of the group, is directed to specific maps, pictures, reading matter, so that each pupil will find the reasons within the comprehension of the class. I cannot overemphasize the importance of this, because so frequently where one child finds one reason, another, another, etc., the child develops that warped type of thinking represented in the statement made earlier—"The sea has made Britain famous." Comparing and checking lists of factors discovered and discussing how these apply, will provide for socialization and build up in each child his ability to do the type of thinking we are after. Finally, in summary exercises those essential cultural items which

characterize the region or distribution, and the factors which help to explain this characterization need to be pulled together.

I have found that I have much the same problems in my freshman college classes as I had with my junior high school pupils, namely their background has been such that I must provide at the same time that the work of the college level is being presented those experiences they need to really understand their work.

AN EXAMPLE OF EFFECTIVE GUIDANCE

The following exercises which I would use with a junior high school class working on a unit on rubber may show how the preparation and guidance principles stated earlier may be applied to a specific case.

We are going to begin our study of rubber in the city in our country where more rubber goods are manufactured than in any other city in the United States. It is Akron in northeastern Ohio—often called the "rubber capital" of our country. Find Akron on your maps. Let us see what this airplane view of Akron tells us about the city. Did you notice the many tall buildings and busy streets as well as the many factory buildings?

This airplane view shows more clearly one of the twenty large rubber plants in Akron where rubber goods ranging from rubber bands to dirigibles are made. Do the buildings look like those of any other factories you have seen? Did you notice that in some ways they remind you of textile mills, but unlike textile mills, some of the rubber factories in Akron are low and others tall buildings.

Let us look at our maps again to see, from what the legend tells us about size of cities, what we can add to our picture of Akron. What does this map show that helps you to see where labor for the rubber mills is obtained?

In the list of the rubber goods manufactured, tires are the leading item. Over 125,000 tires are turned out each day.

Do not these things make you wonder why Akron is the chief rubber city in our country?

Let us examine the following maps to see if they may suggest some reasons. What does the population map show? The railroad map? The coal fields map? In the following account check the ideas you got from the maps and see what other facts you can find that help to explain the importance of Akron in rubber manufacturing.

The facts you have found so far only deal with our own country.

Before we can truly understand the rubber industry in Akron we must see how work in other parts of the world also plays a part. Besides the factory buildings, the workers, the power, the money to carry on the work, the railroads for transportation, and other facts you have found, Akron must have raw materials to use. From your study of our country does United States produce the basic raw material—rubber? Why not? What does this graf showing "Sources of Crude Rubber Imported into the United States" tell about where most of the crude rubber comes from? What sorts of regions do you remember these to be? Can you picture the workers gathering latex from the well-cared-for rows of rubber trees on a plantation in Malaya? These pictures of Malaya may help you do that. Is there anything that surprises you about where most of the rubber is obtained? Since Brazil is nearer to us than the Far East did you not think most of the rubber came from the Amazon forests? These pictures showing the work of the wild rubber gatherers in Amazonia may suggest a reason. The following reading will help you check your reasons.

How does the crude rubber reach our country? This map shows the routes over which the rubber is shipped and the ports from which it is shipped. What port ships most of the crude rubber? What do you think you would see then in Singapore? How does this picture of a port scene at Singapore compare with what you expected? Over what route do most ships carrying crude rubber to our country come? Do you not wonder why the longer route is used? In the reading on page — you will find some facts to help you. At what American port would you find most of the huge bundles of crude rubber being unloaded? Why?

Before the rubber used in Akron's rubber factories reaches them you see many other workers in different ports of the world have played a part. Without them Akron's whole business life would suffer greatly.

In a similar way other rubber manufacturing districts of the world can be tied into the world pattern of rubber. These few exercises show what I mean by guidance. They are of the kind I would use in working orally with a class, but with slight changes could be used in written guide directions. Whether Akron is at your front door or not makes no difference in so far as using it to provide the starting point for a study of rubber.

DIAGNOSING CHILDREN'S ABILITY TO USE MAPS

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Undoubtedly, maps constitute the best single source of geographic information; therefore, teachers must see to it that pupils know how to read stories from these tools with such ease that they will turn to them voluntarily and even eagerly as aids in helping them to solve the problems they meet. "Get the map habit" should be the slogan of every teacher of geography—elementary, high school, or college.

No matter what the level at which the teacher takes a group of pupils the teacher should learn as early as possible the degree of skill with which the pupils read maps. To do this, the teacher may give a diagnostic test to discover to herself and to her pupils the elements of strength and of weakness in their use of maps. Most teachers are familiar with the pre-study testing technique, but many fail to use it because the particular test needed is not available or because it costs too much. With the hope of suggesting a practical method of obtaining a satisfactory diagnostic test at little or no cost, the writer describes a plan used in her sixth grade. With slight modifications the plan can be used at any grade level.

Principles to be observed in constructing and administering the test.

1. Provide a range in subject matter sufficient to catch weaknesses in the most elementary learnings, as well as to reveal learnings in advance of those expected of pupils in the grade being tested.

2. Include several questions requiring the application of the same skill. The results of a test that samples widely are more reliable than those of a brief test.

3. Plan the test so that brief, preferably one-word, answers will suffice.

4. If the pupils are to supply words in the test, provide them with a list of words from which they may choose the ones they need. If the test is dictated the list should be written on the blackboard. The words should be written in alphabetical order to facilitate their use. Include more words than are needed to take the test. Without such a list, the test becomes an exercise in spelling for those who spell poorly.

5. If office help and materials permit doing so, provide each

pupil with a mimeographed copy of the test. If not, dictate the items in the test having the pupils follow the directions step by step. If the test is dictated, be sure that the pupils arrange their papers uniformly. This will facilitate scoring. The teacher should plan in advance a simple, economical arrangement of the papers.

6. If the test is to be dictated, each pupil must have a copy of the same text.

7. If desk outline maps are not obtainable, have the pupils trace outline maps to which they can transfer information from maps in their books or on the wall. Do this in advance of the time the test is to be given.

8. In order to make the test serve its purpose be sure that each pupil works independently.

9. Give the directions slowly, clearly, and, in general, but once.

10. During the test have the pupils use maps. Do not let the test become merely a test about maps.

THE TEST ON THE USE OF MAPS

The following test was dictated to thirty-seven pupils in the sixth grade before they began the study of Europe. The comments enclosed in parentheses are for the teacher.

I. Can you tell directions on maps?

(Give the pupils the number of the page on which they may find a map of the world on which the parallels of latitude are shown as straight lines.)

1. What direction is the Atlantic Ocean from Illinois?
2. What continent lies east of the United States?
3. What continent is south of Europe?
4. What direction is the North Pole from Europe?
5. What direction is the Atlantic Ocean from Europe?
6. What direction is Brazil from Illinois?
7. What ocean is west of the United States?

(Give the pupils the number of the page or pages on which they may find a map of Europe and Asia with the parallels shown as curved lines. To see whether they know that they must follow parallels in going east or west instead of merely going right or left on the map, give questions similar to the following.)

8. Madrid is in central Spain. Peiping is near the coast of eastern China. In what direction would you travel in going directly to Peiping from Madrid?
9. What direction is Tokyo from Peiping?
10. What direction is London from Oslo?

II. Can you use the scale? (Use the same map as above.)

1. How far is it from Paris to Berlin?
2. What is the length of the Mediterranean Sea?
3. (Repeat question 2 with a map of Europe made on a larger scale. Give the page.)

(Use a map of the British Isles or a map of northwestern Europe for the following questions.)

4. How far is it from Southampton to London?
5. How far is it across the island of Great Britain going from Grimsby on the east to Liverpool on the west coast?

(To be sure that pupils realize that the scale of miles cannot be used to measure distances everywhere on world maps, ask questions like the following, using a map of the world whose legend gives the necessary help.)

6. Can you use this map to find the distance across the Indian Ocean between Sumatra and Africa?
7. Can you use it to find the distance between Moscow and London?

III. Can you find physical features on a map?

(When such a test is given before the pupils have made a study of Europe it is necessary in many cases to give suggestions for finding the features called for. Give the pupils the number of the page on which they may find a good physical or physical-political map of Europe.)

1. Name a country part of whose land is below sea level.
2. What body of water separates Spain from Africa?
3. Name two countries which occupy peninsulas of Europe.
4. Name an island which belongs to Italy.
5. Name a river whose delta extends into the Caspian Sea.
6. Does the Danube River have a delta? The Danube empties into the Black Sea.
7. Name a country of central Europe to which you might go to see mountains more than 10,000 feet high.
8. Give in feet the elevation of most of Ireland.
9. What body of water separates England from the continent at the point at which the two bodies of land lie nearest to each other?

IV. Maps answer many questions for us. Can you find the answers to these questions from maps? (Any maps which show rivers plainly may be used.)

1. In what direction does the Thames River flow?
2. In what direction does the Rhone River flow?
3. In going from Paris to the coast do boats go upstream?
4. In going from Budapest to Vienna do boats go upstream?
5. In going from Bordeaux to Toulouse do boats go downstream?

(Use any map whose legend makes it possible for the pupils to judge the comparative size of cities.)

6. Arrange the names of the following cities in the order of their size. Give the largest first.
   a. Edinburgh, Glasgow, and Manchester
   b. Paris, Bordeaux, and Marseille

(Use any map in the book or a wall map whose legend includes the explanation of ocean depth.)

7. In which sea is the water the deeper—the Black Sea or the Caspian?
8. The North Sea or the Mediterranean Sea?

(Use a political or a physical-political map of Europe.)

9. In what city are the laws for the people of Italy made?
10. The people of Portugal?
11. The people of England?

(Use any map showing railroads and canals and having the symbols explained in the legend.)

12. What is the chief railroad center of Russia?
13. Does a railroad follow the Rhone River to southern France?
14. Name two cities of England that are connected by canal.

(Use rainfall, physical, and population maps together for answering the following questions.)

15. What kind of population has Belgium?
16. How much rainfall does Belgium receive in a year?
17. What kind of population has the land bordering the Caspian Sea on the northwest?
18. How much rainfall does that land receive?
19. What kind of land is to be found in the region of very heavy rainfall in northern Italy?

V. Do you know the kinds of maps by name?

(A list of names of maps should be on the board or on the mimeographed sheets which the pupils are using. Maps may be displayed from a case on the wall or rapidly referred to by page in the book. The pupils should write the names of the following types as they are displayed or described in terms of their use.)

1. Rainfall
2. Political
3. Physical
4. Population
5. Relief
6. Vegetation
7. Temperature
8. Product, or economic, or dot, as the case may be
9. Railroad
10. Road
11. Weather

VI. Do colors tell you physical features?

(Early, the pupils should become acquainted with the International Color Scheme used on physical maps.)

1. What color is used to show water?
2. What color is used to show low land?

3. What color is used to show land rising in elevation from plain to mountain?
4. What color is used to show mountains?

VII. Can you make maps?

(The purpose of this test is to see whether pupils can recognize map features well enough to point them out on maps of different scale, color, etc.; therefore, it is well to have them use for this exercise other maps than those from which they traced their outline maps. Pointing the features out by name on wall maps and letting the pupils name them on their outline maps is good practice. It is well to have the children use similar maps in their books while taking this test. This test often reveals surprising weaknesses in ability to observe and read maps. The children should be expected to locate the cities by dots and to show the courses of the rivers on the maps.)

On the map of Europe which you traced, name and locate the following features as I point them out on the wall map. Use the maps in your book to help you find the features. Use the list on the board to help you with the spelling.

1. Countries	2. Cities	3. Rivers
Germany	London	Volga
Portugal	Moscow	Po
Norway	Rome	Danube
France	Stockholm	Tagus

Many relationships can be emphasized in connection with map work. Pictures may be considered with temperature and rainfall or physical maps. Special features can be found, such as polders, swamps, and parks. Each teacher will see possibilities for varying the exercise suggested here.

It takes time to construct and score such tests. Obviously, the teacher must do most, if not all, of the work of constructing the test. If the pupils are given very explicit directions for arranging their papers, or if the tests are mimeographed, the pupils in the middle and upper grades can score their own papers with colored crayons, provided the teacher has built up previously a spirit of intellectual honesty in checking papers. The checking exercise is of great teaching value if the questions are repeated as the scoring is done, and the puzzling items are settled at the time. Then, with all of the pupils, the teacher should see that maps are used in the ways suggested in the test whenever the use of the map will enrich the geographic story. Drills in place geography have gone out of style. Using maps to facilitate geographic learning has not yet come into style to the extent that it should.

WHAT IS IN THE MILE BEHIND AN INCH ON A MAP OR GLOBE

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INTRODUCTION

To grasp an understanding of distance behind the scale of miles or representative fraction found on a map or globe requires thought. Pupils need practice in actually seeing how many times the scale of the landscape has been reduced in order to show the pattern or idea expressed by the map, globe or model and what features are not shown. In order that junior high school pupils be able to read distances on maps and globes with some understanding of scale and the distance represented by the scale suggestions are made here for: (1) observations of the actual landscape, (2) comparison and fitting of the landscape into the map, (3) fitting pictures into maps, (4) fitting maps of one scale into maps of another scale.

The purpose of this report is to suggest several activities leaving the details for development in the individual circumstances.

EQUIPMENT

1. Globe (preferably a 16 inch globe, 1 inch representing 500 miles). A globe which indicates density of population by size of city symbols also helps the student visualize the parts of the earth where population is concentrated.
2. United States Geological Survey Map of the pupil's home region, scale 1:62,500 if available.[1]
3. Wall map, physical-political of the pupil's state. (A road or highway map of the state can often be substituted if the scale of miles is indicated.)
4. Wall map, physical-political map of the United States.
5. Wall map, physical-political map of the world. It is helpful if the map of the world shows the latitudes every 10°, and the longitudes every 15°, since they coincide with the latitudes and longitudes indicated on the globe.
6. Other maps may be included for further comparisons.
7. Representative pictures of the local regions both aerial and those taken from the ground which show:[2]
   a. people at work
   b. ordinary crops

[1] Obtained from the United States Department of Interior Geological Survey, Washington, D.C. approximately 10¢ per map sheet.

[2] Pictures include such visual aids as film strips, slides, motion pictures, photographs and stereoscopic photographs such as Keystone which give the geographic index for each picture. In so far as practicable cultural features are shown in their natural setting and certain relationships thus suggested.

c. transportation forms
d. building materials
e. seasonal activities
f. economic status
g. standards of living
h. landscape features and use of natural resources

8. Pencil and paper

BACKGROUND FACTS FOR UNDERSTANDING DISTANCES AND COMPARISON OF AREAS

1. There are 5,280 feet in 1 mile
   12 inches in 1 foot
   5,280 times 12 inches is 63,360 inches in 1 mile.
2. 1 mile is approximately 8 ordinary city blocks
   1 city block is 660 feet long (City blocks of course vary in length in different communities).

CONSTRUCTING A PLAN OF THE CLASSROOM TO SCALE

It is essential that the pupil understand how to construct a plan to scale. A plan of the classroom may be made to the scale of 1 inch representing 1 foot. The representative fraction is 1:12 since 1 inch on the plan will represent 12 inches of the actual distance. Every object shown on the plan must be proportionally smaller. The pupil begins to see that some details are too small to be shown to scale and if important enough to be included will have to appear in the plan or map in a larger scale. This is what happens on the highway maps, since it is the purpose of a road map to show roads and their classifications, the width of the road is shown larger than the scale of the map.

MAPPING TO SCALE THE SQUARE MILE WHICH INCLUDES THE PUPIL'S HOME AND SCHOOL

The class may construct to scale the square mile which includes their school and home using the scale of 1 inch to represent an ordinary block which is 1/8 of a mile. Using the scale of 1 inch to represent 1 block, or 1 inch to represent 1/8 mile, or 1 inch to represent 660 feet, or 1 inch to represent (660 × 12 inches) 7920 inches, we find the representative fraction is 1:7920. Since there are 63,360 inches in 1 mile it would take 63,360 divided by 7920 or 8 inches to show a distance of 1 mile on a map where 1 inch represents 1 block of 660 feet or 7920 inches.

The plan showing an area of 1 mile each direction or 1 square mile should be completed. The scale may be added in the left lower corner of the sheet and includes:

1:7920 which means 1 inch represents 7920 inches in actual distance,
8 inches represent 1 mile and
1 inch represents 1/8 mile.

One square mile is one section of a township. There are 640 acres in 1 section. Urban pupils can complete the map plan to find how many blocks there are in 1 square mile. They will discover there are 64 square blocks in 1 square mile. Since there are 640 acres in 1 square mile and there are 64 square blocks in a square mile each block will cover an area of 10 acres. Children may then measure to find what part of a city block is covered by 1 acre. (rectangle 330 feet by 132 feet will be 1 acre.)

PEOPLE LIVE IN THE AREA REPRESENTED BY YOUR MAP CONSTRUCTED TO SCALE

Population is recorded in people per square mile. The pupil can learn to estimate the number of people who live in the square mile where he lives. If the dwellings and approximate number of people living in his block are representative of the four blocks in each direction from his home, the pupil can either count or estimate the number of people living in his block and multiply this number by 64 to find the approximate number of people living in the square mile where he lives. When it is not known how many people live in a dwelling the average family can be estimated to range from three to four or five persons.

WHERE DO THE PEOPLE LIVING IN THIS AREA WORK AND MAKE THEIR LIVING?

Observe in the landscape and in pictures the activities people follow in the one square mile around the pupil's home and school to learn what people do to make a living. (Why might one or two occupations found in the community not be representative of the ways people make a living in the community, but indicate the standard of living? Why cannot a single picture always be depended upon to indicate the work people do even in one square mile?)

From the observation of the actual landscape and pictures the pupil can decide what facts about their community their map should tell. Symbols of cultural features such as dwellings, business districts, factories, roads, streets, railroads, and in rural areas fields of crops, etc. should be considered by the class as they decide what features indicate the story of the people's activities. From this ob-

servation of the actual landscape and the use of pictures the pupil begins to form a habit of looking for the relationships in the complexities of man's activities which lie behind the map of a region, a map which has reduced the scale of the original landscape many times in order to bring patterns on relationships into focus.

MAPS ON A SCALE OF 1 INCH TO 1 MILE AND SMALLER

Rural pupils may want to extend their maps to a section or 1 square mile so that it includes the entire township. For many places a township is an area 6 miles square and made up of 36 sections. In such a case instead of 1 inch representing 1 block or 8 inches representing 1 mile, the class may let 1 inch represent 1 mile. Compare the area covered by a scale where

8 inches represents 1 mile, Representative Fraction 1:7920 and
1 inch representing 1 mile, Representative Fraction 1:63,360.

On a map where 1 inch represents 1 mile or 1 inch represents 63,360 inches the scale is 1:63,360. For convenience instead of using 1:63,360 a scale of 1:62,500 is frequently used as is the case with our United States Geological Survey Maps (U.S.G.S.). Maps of this scale can include such details as contours, outlines of cities to scale, transportation forms, etc. Many features of the home landscape are shown on these maps by symbols, and valuable information about one's home community can be read from these maps. These maps help one to understand the landscape features which are brought into focus on the map and can be identified both in the landscape and on the map.

Let us try to imagine a globe of this scale 1:62,500 or 1 inch to 1 mile. The diameter of the earth is approximately 8000 miles. On a scale where 1 inch represents 1 mile the diameter of the globe would be 8000 inches or 666⅔ feet which is more than the length of an ordinary city block. A globe of such dimensions would not have much practical use.

The scale of a map may be much smaller. For example a number of maps, including the International Map of the World (I.M.W.), are on the scale of 1:1,000,000 or 1 inch represents 16 miles.

Let us try to imagine a globe of this scale 1:1,000,000 or 1 inch representing 16 miles. The diameter of such a globe would be 8000 divided by 16 or 500 inches. Five hundred inches is 41⅔ feet. Compare 41⅔ feet with the height of your classroom to see how much higher such a globe would be than the room.

FITTING MAPS OF ONE SCALE INTO MAPS OF A DIFFERENT SCALE

Examine the physical-political wall map for your state. What is its scale? How many times smaller is the wall map of your state than the United States Geological Survey Map of your home area?

What information does the wall map of your state tell about

a. Elevation
   1. Where is the lowest region?
   2. Where are the highest regions?
   3. What direction do the rivers flow?
b. Where are the important cities?
c. What transportation patterns are shown on the map? Where do these routes lead? Why?
d. What pictures can you supply which indicate the work of the people? (Suggestion: Begin with your home community and move into the surrounding communities and regions to discover the work and exchange of services between people.)
e. Upon what communities, regions, and countries do you and the people of your community depend for food, clothing, and shelter? For education, culture, enter tainment, etc.?
f. What goes from your community in exchange for what is brought into your community? Where do these commodities go and from what places do they come? What workers contribute to this exchange?
g. Support your statements in "f" with pictures, written facts from sources including books, magazines, newspapers, and maps.
h. Using the scale of miles in the legend of the map, measure your state from south to north and east to west in miles.

Examine the physical-political wall map of the United States. What is its scale? How many times smaller is the wall map of the United States than the wall map of your state? How does the wall map of the United States compare in size with the United States Geological Survey Map of your home region? What details on the Geological Survey Map cannot be included either on the wall map of your state or the wall map of the United States?

Locate your home on the map of the United States, measure a distance of 100 miles from the legend. Locate places within a radius of 100 miles from your home. Find pictures showing the varieties of work and workers within this radius. What is the difference in the number of people living at different places within this 100 mile radius?

How does the relief pattern of your state fit into the relief pattern of the United States? Where are the lowlands in the United States? Where are the mountains? Follow several of the large rivers of the United States from their mouth to their source and from their source down stream to their mouth. What directions do these rivers flow and into what waters do they empty? What cities are located along these rivers? What evidence in pictures found in your textbooks and elsewhere would indicate these cities are important centers of trade and exchange of products between the people of the United States and people of other countries of the world?

COMPARING A MAP OF THE WORLD WITH THE GLOBE

In order to discover how the map of the world compares in size with the globe, the pupil may ask:

1. How many miles are represented by one inch on the map and at what place on the map is this scale accurate?
2. How many miles are behind an inch on the globe?

This information can be obtained from the map and globe scale found in the legend.

To discover where the map varies from the globe the pupil should make the following comparisons:

1. Do all of the meridians meet as they do on the globe at the north and south pole? If not is the point of the poles stretched and how much? (On the Mercator maps the point at the poles is stretched to equal that of the equator which is approximately 25,000 miles.)
2. Is the distance between 15° of longitude at the 60° latitude exactly ½ the distance between the same 15° longitude at the equator on the globe, the same on the map?
3. Are the parallels which are the same distance apart by actual measurement on the globe the same on the map?
   Where is your map of the world stretched as compared with the globe? What parts of your map have been shrunken as compared with the globe? What parts of your map of the world are so accurate you can use the scale of miles to measure distance? Why can't you use the scale of miles on the other parts of the map?

For comparison of areas the pupil can trace on transparent paper the outline of the United States from the globe. Transfer this outline to heavy paper. Cut out the outline of the United States. On this outline of the United States the pupil can letter on one side the size globe for which the outline is made, and how many miles are behind each inch.

Other information can be added as, connecting San Francisco and New York with a colored line and on the line write the distance 2568 miles; Duluth to New Orleans 1000 miles, etc.

DISCOVERING PLACES WHICH HAVE THE SAME LATITUDE AND ARE THE SAME DISTANCE FROM THE EQUATOR

1. Keeping in mind that the globe represents the earth, locate the place where you live. Since this study was conducted in a suburb of Chicago, we began by locating Chicago, Illinois.[3] The latitude is approximately 42° north of the equator. The distance covered by one degree of latitude is approximately 70 miles. How many miles north of the equator do we live? (42 × 70 miles is —— miles.)

2. Let us locate other places due east or west of Chicago and which are the same distance from the equator.

[3] Pictures of the local home region were supplemented with pictures, slides and films which showed people at work and their activities in the regions mentioned in places (a) thru h).

From Chicago, a meat-packing center of the Middle West, let us follow the 42° north latitude due east thru the (a) heavy iron and steel manufacturing region around Detroit, (b) to Cape Cod, near Plymouth, Massachusetts, (c) across the Atlantic Ocean to Europe, we pass thru Rome, Italy, (d) the oil fields of Baku in the Caucasus Mountains, (e) across Asia, north of Tehran and north of the Himalaya Mountains, (f) south of Vladivostok, Union of Soviet Socialist Republics, (g) across the island of Honshu, Japan, (h) across the Pacific to the northern boundary of California.

3. All places having the same latitude are the same number of miles from the equator.

4. All places having the same latitude in the same hemisphere see their noon day sun at the same number of degrees from the horizon and have the same number of hours and minutes daylight and darkness on the same given day.

5. Hobart, Tasmania, is about as far south of the equator as Chicago, Illinois, is north. Following the 42° latitude south of the equator as we did the 42° north latitude what places do we locate? (Note the predominance of water in the southern hemisphere as compared with the northern hemisphere.)

6. The student may select other places located at different latitudes. A chart may develop which includes:

Place	*Latitude* degrees north or south of the equator	*Other Places with the Same Latitude*
Chicago	42° N. Lat.	Plymouth, Massachusetts, etc.
Hobart, Tasmania	42° S. Lat.	
New York City		
London, England		
Magellanes, Chile (formerly Punta Arenas meaning airy point)		
Quito, Ecuador		
Singapore		
Hammerfest, Norway		
(Other places may be selected)		

Comparison of Distance Along a Latitude Due East and West with Great Circle Distance

With a string the student may measure off the distance along a given latitude due east or west say from Chicago to Rome, Italy. The length representing the distance between these two places can

be measured along the equator by allowing approximately 1035 miles for each 15° of longitude covered by the length of the string representing the distance between two places.

Now pull the string taut between the two places. Compare the length of the distance by measuring the length of the string along the equator. If a blackboard globe is available, the string can be chalked and pulled taut between two places. A second pupil can give the string a light pick so that the string springs back to the globe thus marking the great circle distance between the two places. On a map of the world, which has the latitudes and longitudes, the pupil can plot the great circle distance by locating the same points of latitude and longitude on the map as are marked by the chalk line on the globe.

CONCLUSION

From this experience the pupil acquires an ability to look behind that inch on a map or globe and think more clearly what the actual distance and landscape is behind that inch on the map. The pupil learns to discriminate and distinguish between maps and what they tell. The pupil begins to see that, with enough selected pictures and maps, he can gain a good idea of a region and can read geographic information with more understanding of the meaning of distance and scale.

WAR MAPS: MATERIALS FOR IMPROVING MAP READING SKILLS IN THE JUNIOR HIGH SCHOOL

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Teachers can not overlook opportunities for the discussion of contemporary affairs in their proper relationship to regular classroom activities. We can promote the development of desirable and permanent basic skills by making use of the voluminous current materials available. One means is by using war maps in periodicals, current event weeklies, and newspapers to improve map reading and interpretation. By utilizing these materials in the classroom, the teacher may set up comparatively simple exercises which lead

to systematic instruction and a resulting increase of pupil comprehension.

It is trite to say that maps should be used constantly. Of course, newspaper and magazine maps can not supersede textbook maps, wall maps and other types of maps, but they can be valuable supplements. Places mentioned in current events can be studied and information retained because they are of immediate and vital interest. While the pupils become aware of changing geography and the world wide importance of well known and commonly unheard of places, specific map skills can be taught in an interesting and challenging manner.

Skills basic to map reading include the correct use of the scale of miles, the understanding of direction, and the knowledge and recognition of geographic features. Each skill will have to be broken down, the degree depending upon the ability and experience of the individual. To answer the question: "Which direction is Darwin from Singapore?" the student would first have to locate Darwin and Singapore, as well as know the general directions of north, northeast, east, southeast, south, southwest, west and northwest. He would have to read the question correctly to understand that the direction asked for is Darwin *from* Singapore and not from Darwin to Singapore.

A good map can tell a complete story. Newspaper and magazine maps showing possible military moves, certain actions and developments are not static as maps in the texts. We realize the importance of inculcating the values of democracy, and the responsibilities and duties we share. Perhaps geopolitical maps will awaken those few who do not know that the world is continually shrinking. Maps wisely used have potential power in strengthening attitudes.[1] To realize this possibility, we must learn how to read and how to interpret the modern map.

A casual survey shows a variety of data given in news maps. An analysis of some newspapers, read frequently by pupils,[2] shows the following types of information presented, the more common data being: mileage given between places; land and water, distinguished either by light or dark color; numbers which are referred to below the map; political features; strategic cities; countries; inset maps; key; and a scale of miles. The less common facts are: title of area; size of map; latitude and longitude; clock and

[1] H. W. Weigert, Maps Are Weapons, *Survey Graphic*, October, 1941, 30:528-530.
[2] C. C. Harvey and Cecil F. Denton, *School Review*, March, 1938, 46:199.

time insets; indexed maps; naval, air, and army bases; physical features; four main directions; colored areas; type of projection; and time zones. It would be very helpful if the pupil knew that about seventy miles equals one degree of latitude and that fifteen degrees of longitude represents an hour of difference in sun time. The teacher should stress that the scale of miles can not be used everywhere on some maps of large areas. Simple and clear war maps provide information which allows for the recognition of changes as they occur. A number of *Social Education*[3] describes useful maps, giving the prices and the companies sponsoring the various type maps.

PROBABLE DIFFICULTIES OF USING WAR MAPS IN THE CLASSROOM

The first criticism likely to be made relative to the use of war maps as aids in improving map skills is that every pupil will not have the same map with which to work. It should be possible for the class to bring a certain issue of the local paper or a current events weekly which contains a map. However, a variety of maps will provide the class with more types and a wider range of place locations. This will result in more individual pupil work and more effort on the part of the teacher given to the correct reading of maps. Nevertheless, questions and activities common to most of the maps can be given. Examples of this are: state the title of your map; name the continent it is on or near; locate this area on a map in your textbook; measure the distance between any two cities; name the rivers, cities and islands shown; and the importance of the area to the world today.

Renner's[4] reasons why maps are neglected may apply in this instance as obstacles in the use of current event maps. He states that their role is generally misunderstood; most teachers have not been trained in their proper use; most people mistakenly believe that a map is something solely geographical in character rather than an educational instrument; and that maps possess so many faults. The limited survey mentioned above illustrates the divers data given on war maps. There are many symbols given, altho there is a lack of uniformity in their use. The nature of the medium of publication prevents the grading of the maps, which is a desirable

[3] William H. Hartley, Sight and Sound in Social Studies, *Social Education*, February, 1942, 6:89-90.

[4] George T. Renner, Educational Revision of Wall Maps, JOURNAL OF GEOGRAPHY, January, 1941, 40:13.

project.

Another point of which to be aware is the tendency for one to think he has located a place when he has found it without determining its position on the earth's surface. The study of the countries and cities in the news with respect to one's own position, whether it be Ithaca, New York, or Dubuque, Iowa will help to overcome this weakness as will the continual use of a globe. Then, too, as Collins[5] proved, the ability of pupils to supply correct answers to a geographical description of a location does not ascertain whether they can locate the place accurately upon a map. Conversely, the pupil's ability to make a correct location upon a map does not guarantee that he can answer correctly to a description of the particular place.

Junior High School pupils have difficulty in seeing a given area as a part of the whole. Suggestions for pupil activities below will help to minimize this weakness.

These difficulties are mentioned not to discourage the use of war maps but to call attention to obstacles sometimes overlooked in teaching pupils to use maps.

SUGGESTIONS FOR TEACHER'S USE

The utility of any map is determined by the pupil's ability to interpret the various symbols on the map as well as their relationship to one another. It is dependent upon the pupil's ability to know and to use many individual skills necessary for successful map reading. Teachers in schools which use the "Iowa Every Pupil Tests of Basic Skills, Test B," or J. Wayne Wrightstone's "Cooperative Test of Social Studies Abilities" can use the results of their pupils' performance on the map section. An investigation of the individual's responses will point out certain general weaknesses, which the teacher can attempt to remedy while using maps of the present war. Most of the questions on these tests do not attempt to diagnose the difficulties involved in interpretation.

The teacher should make certain that the seventh graders select the simplest maps that are printed. After essential location facts are learned, it is advisable to let them use more complex maps. Other facts that should be taken into account by the teacher include the clearness of the map print, the size of the scale, the usefulness of factual material, the presence of as few facts as possible, the

[5] A. W. Collins, Pupil Comprehension of Place Location in High School United States History, JOURNAL OF GEOGRAPHY, November, 1939, 38:329.

key, and the value to your classroom work.

The following questions can be used diagnostically or in an achievement test. The teacher should expect numerous difficulties involved in the answers. They are based on a newspaper map of the Far East. A teacher desiring to use them can insert the names of different places in each question to facilitate use for another map area.

I. For teacher's use

A. Use of scale of miles

1. How many miles is it from the left side of the map to the right side—directly along the equator?
2. What is the straight-line distance from Batavia to Darwin?
3. How far would you have to travel by plane to go from Singapore to Manila?
4. What is the straight-line distance from Rangoon to Manila?
5. How many times would you have to travel from Ithaca, N.Y. to Elmira, N.Y. to go one thousand miles?
6. Which would be the longer trip by airplane—from Chungking to Batavia or from Sidney to Calcutta?
7. Which is closest to the equator—Darwin, Singapore or New Delhi?

B. Understanding of directions

8. Which direction is north on your map?
9. What ocean is west of Australia?
10. Which direction is Darwin from Singapore?
11. Going from Calcutta to Batavia by plane, you would be travelling in which direction?
12. Which continent is north of Borneo?
13. What is the general directon of flow of the Irrawaddy River?
14. Which ocean is south of India?

C. Knowledge of geographical terms

15. Is Darwin located on an island or a continent?
16. Which island is the largest of the Dutch East Indies?
17. Is Calcutta located at the source or near one of the mouths of the Ganges River?
18. Is a strait a land mass or body of water?

19. What island lies off the south coast of India?
20. Is the body of water lying east of India a cape, bay, gulf, or ocean?
21. On what extension of land are the Malay States located?
22. What city is on the delta of the Ganges River?

D. Drawing conclusions

23. Which city is farthest above sea level—Rangoon or Mandalay?
24. What products would be exported from Melbourne?
25. What type of climate would you expect in Calcutta at this time of year?
26. Why are there few railroads in Borneo?
27. What products would you find in Java?
28. In going north from Rangoon on the river would you be travelling north or south?
29. What season is it in Canberra, when it is December in Ithaca?
30. What time is it in Manila if it is 2 P.M. in Singapore?

E. Other questions, if map has an extensive key

31. What is the approximate population of Calcutta?
32. Are there many more railroads in Indo-China than in India?
33. What cities does the Burma Road connect?
34. Which city is larger—Bombay or Calcutta?
35. How far above sea level is the northern section of Burma?

II. A list of suggestions for student use

A. Bulletin board displays

1. Mount the map on a sheet of white paper so that a large margin remains. In the margin put geographical terms with their definitions, and draw a line from term to the respective locations on the news map. For example, "Island—a tract of land surrounded by water"; then draw a line to an island on the map.
2. Exhibit a series of maps of the same area with different scales.
3. Place a large map on the bulletin board. Take news maps showing certain areas enlarged and extend a ribbon or string from them to the corresponding places on the large map.

4. Arrange a series of maps telling a story, such as political change.
5. Place a large map on the bulletin board. Select pictures of persons, places, things or events and extend a ribbon or string from them to the corresponding places on the large map.
6. Students make symbols for products and paste on a large current events map.
7. Display different types of newspaper and magazine maps.
8. Student committee place news maps on bulletin board and have them attach below a list of questions such as "Which way does River A flow?" "What country borders C on the North?"

B. Instructional games
1. Game: How many facts can I tell about my map? An example would be, Manila is northeast of Singapore.
2. Quiz contest on "Where is this?" Student gives news facts of a place location and other students answer. This should be followed by location on wall map or text map.
3. Students mount maps and attach questions about their maps. Exchange with other students and correct each other's answers.
4. Students sketch from memory the outline of an island or country studied. With no names on the sketched map, see who can identify area. Later, fill in names of locations.
5. Spell down on the names of cities, countries, personages studied while discussing war maps.

C. Collect in notebook maps which relate to regular units being studied.

D. Use as a basis for coloring outline maps.

CONCLUSION

The presence of at least one map in the daily newspapers and a series of maps in Sunday editions, in addition to maps in almost every issue of current event sheets, as well as those in picture and news magazines makes war maps readily available.

This type of visual aid material gives teachers another timely

and important instructional tool, which will increase the pupils' knowledge of specific skills in map reading.

In using these maps in current event and regular class content work, the pupils' map interests may increase: at least, there will be a greater awareness of the maps in the news publications. The teacher will keep up-to-date with the fast moving affairs and will develop a wider basis for sound interpretations of world happenings. Map reading skills would increase with directed instruction.

War maps provide a source for individual activities and instructional material for display. In addition to increasing our knowledge of map facts and improving our map reading facility, the use of war maps may be developed into a strong propaganda medium for our democratic front.

THE USE OF USGS MAPS AT HIGH SCHOOL LEVEL

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Now as never before the USGS* maps hold a fascination for the student in junior high school. He quickly appreciates the value of these maps that can tell him the lay of the land at a beachhead, the type of terrain to be encountered by a pilot, the opportunities for concealment along a highway, or the relief of Sleepy Hollow. One reason for the general lack of familiarity with USGS maps both in and out of school is the fact that we in the United States have long neglected the personal use of these maps, a practice in contrast to the wide spread use in England and on the continent of the similar and often more detailed topographic maps. Consequently most people do not feel as much at home with the USGS maps as they do with the free road maps obtained at the former corner filling stations.

In introducing the USGS maps to a class, it is desirable to work in the field as well as in the classroom. Some aspects of relief are visible from the window and doorstep of every school. Some sites are more advantageously located than others but no one school site would be so favorably situated as to provide actual models of

* The letters USGS refer to the United States Geological Survey.

NOTE: An index to USGS maps may be obtained from the United States Geological Survey, Washington, D.C. There may be suitable maps available for your locality, state, or near-by area. Editor.

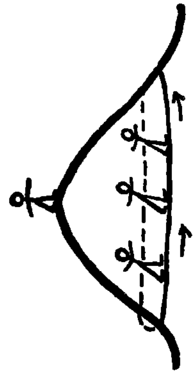

Fig. 1.

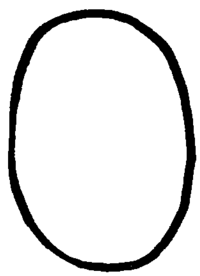

Fig. 2.

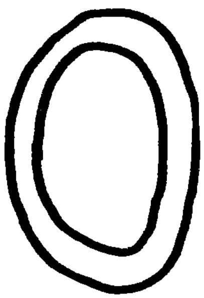

Fig. 3.

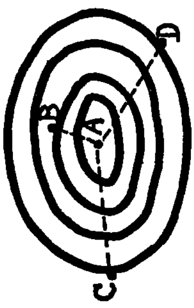

Fig. 4.

Fig. 5.

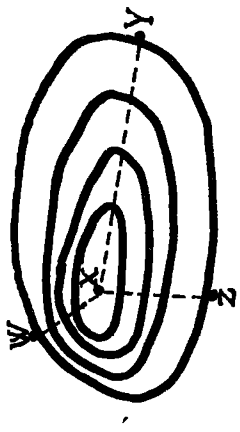

Fig. 6.

Fig. 7.

all the varieties of relief. Therefore, the recognition of the many features, and the identification and recognition of symbols representing relief must be developed in the classroom. This article suggests some of the satisfactory devices used in a junior high school class.

CONCEPT OF CONTOUR LINES

Since the USGS maps are often referred to as "contour maps" the concept of contour is readily developed. The students are familiar with both "tour" and "detour." Loosely defined, "contour" might be translated as "tour around" or "go in a circle." This idea grows out of the following suggested activities which have been used in class in lieu of a hill in the vicinity of the school.

STEP I. The profile of a hill is drawn on the board. In imagination a student is placed on the hilltop and observes his classmates walk around the hill on a path at the base of the hill (Fig. 1). The student on the hilltop then draws a line on the blackboard to represent the path his classmates followed (Fig. 2). If anyone in the class does not agree with the pattern drawn, then let that student stand on a desk and watch another pupil walk around the desk. The idea that the path is a circular line or oval-like in shape should be understood by everyone in the class. The group is now ready to resume the earlier situation.

STEP II. A student returns to the theoretical hilltop. The class now walks up the hill about one-fourth of the way beyond the first path. At this elevation, the class walks around the hill on a path at this theoretical level. The student on the hilltop now places a second path into the previous pattern (Fig. 3). If the students fail to see that the second path must be drawn inside the first path, then return to the desk demonstration with the conditions properly oriented. Obviously two more paths will fall within the first and second circles already drawn if the idea is carried thru two more steps.

ANALYSIS OF SYMBOLS

The hill is now seen in profile and in contour. The parts of the hill are labeled (Fig. 4) and the class is guided to interpret the relations of slope, distance, and direction. Some of the reasonable ideas that are to be learned from an analysis of the sketch are:

(1) The top of the hill is at ——.
(2) The base of the hill is at path ——.

(3) The slope along *AC* is about the same as at *AD* because ———————— and ————————.

(4) The shortest path shown is ————. This is true because ———————— and ————————.

After the use of simple profile and contour sketch, the concepts of steep slope and gentle slope are developed step by step as in the regularly shaped hill in Fig. 1. Simple exercises to interpret these variations in patterns bring out the contrasts and comparisons (Figs. 5 and 6). Suggested problems are:

(1) The longest slope is along path ————. Proof is ————.
(2) The steepest slope is along path ————. Proof is ————.
(3) The path on the south slope is lettered ————.
(4) If path WX is 1 mile, then path XY is ———— miles long.
(5) The direction of path XY is ————.
(6) If you were at the base of this hill, which path would you choose to walk up to point X? Give reasons for your choice.

The shape and appearance of other types of relief features are suggested by the class and teacher. These examples may be seen from the classroom window, from pictures, or recalled from travel experiences. A rough profile of these types is sketched on the board by different pupils with results similar to the illustrations in Figure 7. The identification of the features brings up the terms: drumlin, terraces, mesa, and sinkhole. Using variations of the ideas already suggested, the teacher guides the analysis of forms and students can sketch correct topographic representations of these features.

DEVELOPED GENERALIZATIONS

Some common generalizations are evolved at this stage. Directed by teacher comment and questions, a summary of ideas up to this point includes:

(1) Closely spaced contour lines indicate steep slopes or cliffs.
(2) Widely spaced contour lines indicate gentle slope.
(3) Depressions are indicated by closed contour lines with hachures.
(4) Features shown in profile can be illustrated in contour, and features shown in contour can be drawn in profile.

These generalizations are now applied to pupil experiences. They are able to suggest ways that this information is of use to a hiker, a pilot, a car driver, and one interested in real estate. Some students are able to suggest ways that a previous knowledge of the USGS maps would have helped them at camp, on trips, or in planning a fishing or sight-seeing holiday.

SELECTION OF THE FIRST USGS MAP FOR CLASS USE

By now the students are really interested in examining these wonder maps. The map used for this initial experience depends upon the set available, the part of the United States in which the class is located, and the kind of terrain that would suit the purposes of an introductory lesson. A rather simple map with a common contour interval is desirable.

The many new symbols, the key and legend, the scales, and the place names will hold the attention of the individuals for several minutes. They will be so absorbed and occupied in discovery and exploration, that it is just as well to allow them time to satisfy some of this consuming curiosity. The teacher can move about the room to answer individual queries and to share with a student his pleasure at the discovery of the meaning of some data, or to direct a problem of interpretation to a student equal to the challenge. Informal discussion is resumed when students pool and share the information they have gathered from the study of the map.

PROCEDURE OF MAP ANALYSIS

The class is now ready for a systematic analysis of the map. The marginal data need to be examined and understood. Words such as quadrangle and survey are readily associated with more familiar terms, e.g.: a campus quadrangle, and Washington's surveys in the Ohio Country. Latitude and longitude are read and interpreted. It is helpful to sketch a grid on the blackboard and as a student reads the degrees, another student can write them on the proper lines. These distances are translated into miles, e.g.: $\frac{1}{4}°$ Lat. $= 17\frac{1}{2}$ miles, and $\frac{1}{4}°$ Long. (at 40° Lat.) $= 13\frac{1}{4}$ miles. Thus the quadrangle with a scale of 1:62,500 covers an area equal to $17\frac{1}{2} \times 13\frac{1}{4}$ miles. This same area is pointed out on the wall map of the State or of the United States. A small rectangle (to scale) should have been prepared by the teacher and a student can now orient the card in the correct place on the larger map.

The fractional scale needs more explanation and demonstration than the graphic and statement scales which are commonly used at earlier grade levels. However, all three should be equally familiar to the students. They should be able to recheck by use of different scales the distances on USGS maps previously determined by computation of latitude and longitude. Further application of the idea of fractional scales should be made to the various

illustrative materials in the classroom. A USGS map of 1:62,500 is better for introductory purposes than the 1:125,000 which should come later. The use of a rectangle four times the area of the 1:62,500 size is needed to cover the actual land area represented on the scale twice the denominator of the original.

The three colors: blue, brown, and black, and the kinds of features each represents, will seem logical. The contour interval is now related to the earlier sketches of the hill.

The date of a map is important. If the students and the teacher are acquainted with the area mapped, some one will be sure to note ommissions of recent date, e.g.: a bridge, highways, a tunnel or a reservoir, irrigation or drainage ditches, and suburban developments. It is possible that some one can relate an incident since 1941 in which map data confused a scouting party or gave advantage to another patrol.

MAKING INTERPRETATIONS OF SYMBOLS

Up to this point the students have made an acquaintance with one USGS map. The mere identification of a feature for the sake of identification should rapidly expand into more meaningful ideas. The relationship between types of features and their location calls for an interpretation of actual map data. The following illustrations are to this point:

The roadway is straight and level. It parallels the base of the cliff. The highway from the ridge does not come down the face of the cliff but winds back and forth to make a gentle grade for traffic.

I know that the headwaters of this stream are here because the blue line is thin. Also the tributaries meet the main stream at this angle (indicates an acute angle) as they trickle off the hills. The actual elevation in the headwaters area is 1400 feet and over here in the northwest where the stream is larger the B.M. (benchmarker) is 1257 feet.

Students display a real curiosity about depression contours. The depth of the depression is estimated as readily as the elevation of a hill. The teacher must decide how far into the realm of the origins of sinkholes or kettleholes or lagoon formations the discussion should move with topics of this type.

Thruout all this seemingly abstract introduction to USGS maps the teacher needs to guide the students to visualize the real thing represented on the map. The contrast in slopes of hills, the descent of a stream, the area visible from a point of vantage, the area out-of-line-of-vision from a lesser elevation, the feeling of density or

sparseness in settlements along the highways, the erosional effects of headwaters, the appearance of a part of the area from the lowest elevation in the area, these are suggested visual images obtained from the map.

EXPANDING THE ACQUAINTANCE WITH USGS MAPS

Another set of USGS maps will suggest different features but it might be best to delay changes in scale and contour interval for another class period. The common relief types easily represented and identified should be used but the selection is qualified by regions in which students live. Among the acceptable features for early study are: delta, plains, lake or seashore, mountain or hill country, ridge or plateau, drumlins or mesas, swamps or sinkholes, and stream valley or canyons.

INDIVIDUAL PROBLEMS WITH MAPS

After the class has had the experience of examining a variety of types of relief features and culture patterns, a series of studies on the home state may be desirable. In this situation, each student has a single and different map. Questions are attached to each map. Planned as a worksheet, the student works entirely on his own. This same procedure serves as a checkup to ascertain what the students have learned and how well they can work independently. Altho the questions are often similar in nature and the technique of arriving at the interpretation is similar, each student will have to work out his own problems. Typical statements on the worksheet might be the following:

(1) The part of the state in which this area is located is in the ———— in the region known as the —————.

(2) I know this is so because ——————.

(3) The main stream is called —————. Its direction of flow is —————. Facts that prove this statement are: ——————.

(4) The highest elevation is ———— ft. and occurs in the ————— part of the map.

(5) The lowest elevation is ——— ft. and occurs in the ———— part of the map.

(6) If you were paddling a canoe up the Little Left Branch, the direction would be ————. Some of the difficulties along the way would be ———— and ——————. (three waterfalls and a dam)

(7) The blunt effect on the small "lakes" north of Logtown are there because ———————. ("man-made lakes" or reservoirs)

(8) The town of Beaver is ——— miles from Logtown by airline. The kind of place in which airports are located in these two towns is ——————.

(9) The black line cutting across the map in the lower left area is a —————

(flume), and it is used for ————————————.

(10) Describe the view to the left of the railway as you approach Beaver from Logtown.

(11) Comment on population density on this map. Be specific about areas.

FACTS ARE RETAINED

The apparent ease with which students recall the details of individual projects weeks later has been amazing. For example: five months after we had used the USGS maps, a student who worked with the Massena Quadrangle recalled that the town was not on the St. Lawrence River and that the hydroelectric power was developed by diverting water into an artificial channel which linked the local stream with the St. Lawrence. Other features are re-visualized and recalled for class use. Of course, in many instances the teacher may recall the item and then find a way to relate the thought to class discussion. If the association is evident some student will be eager to take over and complete the thought.

It is equally important not to assume things to be true that are not true in fact. It happens that there is a Sleepy Hollow on both the west and east banks of the Hudson River. On one map the class discovered Sleepy Hollow and at once different students offered such associations as The Legend of Sleepy Hollow and Ichabod Crane and Washington Irving. Before the comments were completed, one student waved his hand most violently and protested that what had been said was all wrong. The teacher had anticipated this—having said nothing to discourage the students offering the above comments. "Why do you object?" the teacher inquired. "Well," said Ned, "the Sleepy Hollow they are talking about is down near Tarrytown and that is down the Hudson and on the east bank and this map here, the Kaaterskill, is *up* the Hudson and on the *west* bank so that puts this Sleepy Hollow in the Catskills." The lesson was well learned by the rest of the class. If a student had not made the correction, it would have been the duty of the teacher to have brought about this same analysis in another way.

CONCLUSION

The more associations that can be pointed out in relation to the experiences of the students and to current events, especially to reports of troop movements and single incidents along the battlefronts, to Scout activities and observations in the field, the more meaningful will be the lines and symbols on the USGS maps. Per-

haps the most difficult thing to do is to visualize the mapped areas in terms of reality. It will be thru experiences mentioned above that the important and imperative ability and skill can be developed. By suggesting the site and situation, the students might be able to sketch the topography and of course the reverse of the plan as well. Frequent drill on such concepts as "contour lines bend upstream" and "upstream is toward the headwaters" is necessary to acquire skill and correct understandings. Short problem solving exercises presenting the same idea in a number of ways will help to fix the right concept and provide for growth in the ability to use and to think in terms of topographic maps.

GEOGRAPHIC PROFILES: CULTURE ON TOPOGRAPHIC PROFILES

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The close relationship between topographic features and the distribution of population or other cultural features is seldom well illustrated by a grafic or quantitative method. Cultural maps are used more and more often by modern geographers* to emphasize the importance of topographic control over cultural landscape.

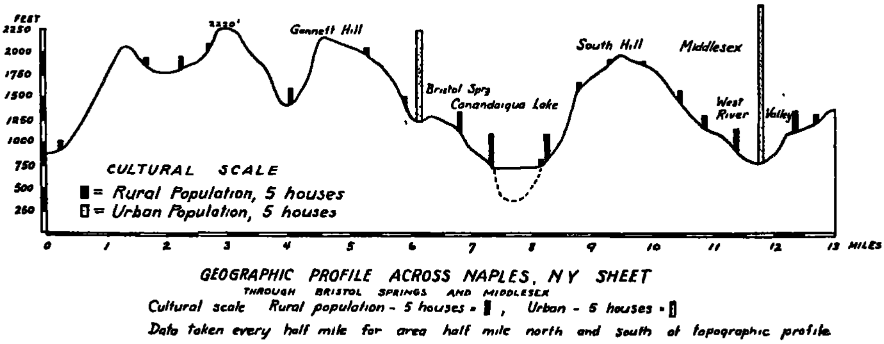

FIG. 1. Geographic profile across Naples, New York, sheet, thru Bristol Springs and Middlesex. Data are taken every half mile for area a half mile north and south of topographic profile

Exact information, if given, frequently fails to be comprehended by the student and must be carefully scrutinized by the scientist.

* Cf. P. W. Bryan, Man's Adaptation of Nature, Henry Holt and Co., New York, 1933.

The method here described was devised to enable the college student to make grafic studies of culture distribution. Using a zone on both sides of the line of the topographic profile, the geographer counts houses by regular intervals. These numbers in the form of bar grafs are then placed upright on the topographic profile. Figure 1 shows the simplest form of the method. Small urban groups may be treated similarly and marked by a symbol on the bar. The census, atlases, or gazeteers furnish statistics for cities and towns.

Such placing of the bars seems, at first glance, to make them incomparable. But lengths of bars may be compared even tho the bars are not standing upon a common base. If they are removed from the profile itself, the effectiveness of that intimate relation is destroyed. Moreover, a smooth curve taken by connecting the tops of the bars may be placed above the profile for correlation with it. Some may prefer it reversed to fit the topographic profile.

Other culture, such as transportation lines, churches, schools, bridges and dams may be assigned values on the scale used for population and added to the same bars with or without any distinguishing symbol. The scale and relative value of the different kinds of culture must be adjusted to the region and the importance

FIG. 2. Canandaigua Lake—looking north. Notice the cottages on the deltas and the vineyard in the foreground

of each in the region, just as the scale of topographic profiles is adjusted to the amount of relief.

A realistic modification applicable to larger scale profiles may adapt the method to elementary work. Replace the bars with symbols (such as the churches, houses, and schools on the U.S.G.S. quadrangles) determining the size or number of them by a scale. Rural land use can be added in this way.

The area used to illustrate the method lies in the Naples quadrangle of the Finger Lake region of New York State near the northern edge of the Allegheny Plateau. The profile is drawn east-west across the southern portion of Canandaigua Lake. This region was selected, first, because the relief is sufficient to make the results quite obvious, altho little if any more real than in a region of less contrast. Secondly, the line might here pass thru the towns of Bristol Springs and Middlesex, which introduce the urban relationship, and so make a more useful profile.

The profile shows to just what extent relief influences culture. Most of the population is concentrated in the valleys rather than on the steep slopes (Figure 1); more people live on flat hilltops than steep ones, etc. Canandaigua and Middlesex valleys have the dens-

FIG. 3. Middlesex—looking northeast.

est population, as would be expected from their size, but differ in the distribution of it, due to the dry bottom of the latter and the lake in the former. The urban group of Middlesex is therefore in the

valley (Figure 3) with the most level surface available, while the population of Canandaigua Valley is concentrated on the shores of the lake. The two valleys merge farther to the south, where Naples is located.

The east side of Canandaigua Valley is steeper than the west in this vicinity. This is reflected in the character of the streams on these slopes, those on the east being rainwash streamlets so small as to frequently escape notice on the topographic sheet. Streams on the west side are longer, hence larger, and with more prominent deltas. Bristol Springs owes its location at least in part to several of these western streams. This topographic difference is further reflected in the cultural pattern of the two sides of the lake. On the west side a well surfaced road lies far back from the shore and is bordered by farms. Summer cottages dot the shore, chiefly the deltas. On the opposite side, however, a rather indifferent road occupies the narrow strip between steep hillside and water. Such contrasts between classes of roads may well be brought out on profiles showing other types of culture than houses only. Symbols of land utilization are very effective on such a profile, for example, the grapevine on the west slopes here, sheep on the hilltops, and forest on the steeper hillsides.

This geographic tool which has been useful to the authors in relating culture to topography, as illustrated in the Naples area, should lend itself to use and modification by other geographers in other regions.

BETTER CAPTIONS FOR PICTURE STUDY

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Practical captions on pictures provide for the expression of worthwhile geographic relationships. The possibilities in a picture of satisfactory geographic quality[1] are so often limited by the unhappy choice of the idea stated in the caption. Paradoxically, the most significant item may be overlooked and some small detail is emphasized.

The mere phrasing of a caption is a controversial topic. Witness the evidence at hand. A casual examination of textbooks and illus-

[1] For an understanding of the geographic quality of pictures and their classification, see article by Lynn Halverson on "Pictures in the Teaching of Geography" in THE JOURNAL OF GEOGRAPHY, Dec. 1929.

trative materials for class use provides a variety of examples. Some pictures lack ready-made captions. These pictures can be used in several different situations with a different point of view suitable to the occasion. Other pictures appear with long or short captions, the content being to the point or quite unrelated to the central theme in the view. These, then, are the materials provided for supposed acceptable picture study material.

ANALYSIS OF READY-MADE CAPTIONS[2]

The shortcomings of ready-made captions are evident in the following examples which are not exact quotations but the similarity is sufficient to illustrate the points made in the above paragraph.

"Ploughing in Iran. The plough is drawn by eight animals."

"Modern Coking Ovens. Every part of the coal is made into some useful product in the modern coke oven. By the use of this plant, intelligent conservation is practiced."

"This is a wheat field in the Dakotas. This farm has hundreds of acres in this crop. How many bushels will it yield per acre?"

Exception is taken to these samplings because of (1) the use of fragmentary phrases, (2) the needless repetition of words and ideas, and (3) the introduction of irrelevant material. Consider each of these statements in order. It is not necessary to read the caption to learn that there are eight animals and that the work is the preparation of a field. A casual glance at the picture and at the caption satisfies the reader. The challenge is lacking to raise problems about the work of the people or why they are performing their work in ways different from the reader's experience. Both the first and second examples repeat a needless phrase. In addition, the second caption introduces an idea about conservation that has little to do with the picture. If this idea is used as a means of contrast with a bee-hive oven, then comparative picture study can bring out worthwhile comments relative to conservation. The third caption uses words and terms that are vague and irrelevant. The concept of "hundreds of acres" has little meaning to those not living in the wheat regions. Finally, the question as to the yield per acre is the height of incongruity. The answer to that query can be found in a table of statistics and no amount of gazing at the picture will ever provide the solution. If such data are facts to be learned—for such facts are worthwhile and are of value at

[2] For obvious reasons, the pictures and captions from textbooks are not reprinted in this article. The exact words are not given.

certain grade levels—then a picture is not to be used as an excuse for bringing out that detail. It is true that the low productivity per acre is related to extensive farming in marginal production areas, but the picture cannot shed any light on the exact fact asked in the question. If the pupils raise the question about yields per acre after studying other aspects of the picture, then follow the idea thru by using the proper source material and reference books.

STANDARDS FOR CAPTIONS

The inadequacies of captions have been briefly suggested. The need for improvement is evident. Standards for desirable captions should, (1) provoke examination of the picture, (2) present an idea in clear and correct form, (3) employ a variety of ways of expressing ideas, and (4) use properly graded vocabulary and concepts. These standards are applicable to all classes of geographic pictures (see Halverson article for this classification). These standards are applicable to all types of pictures such as slides, movies, flat views, and those used in an opaque projector. These standards are suitable for both oral and written use. When pictures are used for individual study, write the captions on a slip of paper and clip to the pictures. When pictures are used for class discussion, follow the same standards and principles as in written expression.

By way of illustration, these criteria are now applied to two of the same suggested mental pictures cited in the third paragraph.

"From a study of the picture, discover why so many animals are needed to prepare this field."

The pupil must study the picture to discover, (1) the number of animals, (2) the kind of work going on, (3) the tools used, and (4) any evidences that help to explain why the animals, tools, and work are carried on in this manner. The evidence shows: cloddy earth, turf or sod or stubble cover, wooden plough, and a high sun for the shadows are directly under the beasts.

A suggested caption for the wheat farm picture is:

"This Dakota wheat farm is an example of extensive farming. Explain."

Evidence gathered from the view includes: (1) wide spread area to the far horizon, (2) lack of farmsteads, (3) use of machinery, and (4) the apparent sameness of land use. Any corollaries resulting from these ideas provide the class with problems to be solved by further reading and by the use of other reference

materials.

USE OF PICTURES

If a picture is worth printing, it is worth using. Of the many ways to use pictures, a few are suggested: (1) to introduce a unit, (2) to orient a unit, (3) to raise questions, (4) to answer problems, (5) to amplify and verify information, (6) to state definitions, (7) to review a unit or portion of a unit, and (8) to set up drill and review content. Possible ways of using pictures in each of these situations will occur to the alert teacher (see Halverson article for details).

VISUAL IMAGERY IN PICTURES BASED ON CAPTIONS

A picture of high geographic quality can have several possible captions. A different emphasis is achieved by the mere wording of the caption. The teacher or author must decide the point of emphasis. Imagine a view of a nomad camp in the Iranian Plateau in which the details observed are: bare hills, rocky land, few grazing sheep, no trees, a tent, a loom with a partially completed rug, and a few nomads. Assume that the caption of the picture is, "Rug Making in Iran." The obvious omissions come to mind. Here is a picture with possibilities unlimited, and just nothing is done to capitalize on the wealth of visual information before the reader. Three different captions are herewith suggested for this picture with each one using possible geographic relationships visible. Each caption in turn emphasizes one item: the tent, the resources, and the rug making.

Example I. "Why do these nomads use a pavilian type of tent?" *From the picture* the following ideas can be noted: (1) short poles, (2) lack of trees, (3) moving nomads would not want to carry too much lumber, (4) pavilion tent gives more shade than a tepee type, (5) a low tent is close to the ground in open country and so is out of the wind, and (6) loom is out-of-doors, so it is not very rainy here most of the time.

Example II. "How does the way these people make a living fit into this kind of region?" This caption seeks to emphasize the influence of natural resources on occupation and land use. *From the picture* the following ideas can be noted: (1) thin and scattered grassland must be good enough for sheep, (2) the hillsides and rough lands would be better for sheep than for cattle, (3) the

people can move their tent homes when the pasture becomes poor, and (4) wool is used for rugs which are valuable and will not spoil before they are sold.

Example III. If the emphasis is to be on rug making, then the caption might be, "Why is rug making important to these nomads?" *From the picture* the following ideas can be noted: (1) the loom is handmade, (2) the wool is from their own sheep, (3) the loom can be moved, it is not stationary factory machinery, and (4) almost the only product the nomads can make for sale is rugs. From personal experience, or from exhibits seen at a Museum, or from pictures the pupils will realize that hand work commands a high value and the rugs are worth carrying to a caravan center to be sold.

Altho these three captions, stated in question form, direct attention to three different aspects of the same picture, there are other phases that have not been mentioned. Comments will be made and questions asked about the clothing the nomads wear, the possible aridity of the region, the lack of some of the commonly accepted items of everyday life, nomad food, natural vegetation, and other features that will occur to pupils. To take adequate and correct care of these problems, it is possible that other pictures and maps need to be used. Further reading is also advisable.

EXPANDING THE FULL USE OF THE PICTURE

It will be evident by now that the full use of a picture is not exhausted by a single caption. Other ideas are brought out by the expansion of suggestions given in discussion and in pupil cues. Equally important in the discussion of picture content is the avoidance of wandering too far afield from the actual facts. The realm of fanciful imaginings and haphazard guessing of possibilities is to be discouraged with firmness. Pupils are aware of the limits permitted in wandering off the topic and from class standards. These self-critical appraisals are the outgrowth of constant effort on the part of the teacher to return the critical evaluation of class contributions to the class. Teachers are prone to either let casual inaccuracies pass by unnoticed or to pass judgment most of the time. Surely the weighing of evidence and the practice of suspending judgment until a reasonable amount of evidence has been considered provide for the exercise in the practice of critical thinking, one of the desirable goals of education for citizenship.

PICTURES LACKING THOUGHT PROVOKING IMAGERY

As the saying goes, "You can't pump water out of a dry well," so also it is impossible to ask thought provoking captions about pictures lacking content. Again, reference to the Halverson article will clarify this idea that pictures of low geographic quality have little to offer. Consider the pictures of some familiar buildings, the interior of an industrial plant, an invention, and a posed picture. There is little actual geographic quality about any of these items. Therefore, it is not only impractical but irrelevant to use captions such as the following:

"Discuss the architectural features of this building."
"Name the raw materials used in the manufacture of tires."
"Who invented this machine?"

Altho these sample captions may appear absurd, similar examples actually appear in books and on ready-made visual materials. If you look about you with a critical eye and mind, you are sure to find equally inept illustrations.

CONCLUSION

A helpful check upon the appropriateness and suitability of a caption is to examine the content on the basis of (1) the thought, and (2) the phraseology. The thought should challenge the pupil to study the picture and should be limited to the actual ideas to be obtained from a study of the picture. The phraseology should be simple, direct, free of verbiage and high sounding terms, and based on the child's experience. The stating of a satisfactory caption may not come with the first attempt, not even the second. After some practice, the main theme of a picture will be readily recognized and the caption will provide challenging class discussions.

AN EXPERIMENT IN TEACHING CURRENT GEOGRAPHY

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The Problem

The teaching of social studies using a course of study including history, civics, geography, science, and hygiene in the elementary and upper grades has resulted in a surprising deficiency in the knowledge of place geography. Many high and junior high school students have no idea of the location of places mentioned in the current events papers or in their text books. An increasing awareness of this deficiency grew upon me each year I used the social studies course and I tried stressing place geography in the study of places prescribed in our course. The results were not gratifying and high school teachers were still complaining about the lack of geographic knowledge. Then I decided to supplement the social studies course with a course in geography.

Since the pupil's contact with place geography comes largely thru their reading of current events, I decided to have them study the places mentioned in the news. Two divisions of approximately twenty-five seventh grade pupils spent a half hour each day for the entire school year studying these places.

Procedure

The children were provided with sets of maps consisting of one world map and a map of each continent. They were pleased to acquire this new property and to know what we were going to do. I asked them what plan we should follow and they suggested making a list of all places in the news, locating these places, and studying the ones about which there was most news. That plan was followed and the first individual lists were made. Truly they were "wonderfully and fearfully made," too. In addition to the names of actual places, i.e., countries, cities, continents, oceans, and seas we had the following:

English	bay	Loyalist	Stalin
Germany's	rivers	French	Mussolini
Nobel Prize	village	Columbia University	
Southern states	Nazi Party		
Duke of Kent	steamer	Cordell Hull	

I admit I was a bit nonplussed by these lists. The lack of knowledge was more suprizing than I had imagined in my wildest guesses.

Our first lesson was one in English rather than in geography but we finally had a composite list of bona fide places in the news and we proceeded to locate them on the maps of the various continents. The world map was reserved for locating places about which we had studied after we had read the news and located them.

The location proved to be a difficult matter, too, for the majority of the class knew little or nothing about using maps indexed in atlas style. Some actually thought they had to look at each map in the geography. It is my sincere belief that authors of geographies are at fault here for most of them fill their texts with perfectly delightful maps but do not index them. Naturally the child has no guides to give a hint as to even the approximate location. Children learn to use indexed maps very easily and should be given these time savers early in the study of geography. Then the matter of indicating dots, stars, etc., for cities; broken lines for boundaries; and blue lines for rivers was not understood and had to be clarified. Thus, our second lesson was on the interpreting of maps.

Now one lesson on each of the above, did not clear up all the difficulties for all time. "Cordell Hull, Mussolini, Nazi, French, Germany" appeared again and again in subsequent lists for the entire first semester and in the eighth month "Mussolini" cropped up again. Likewise, the use of the indexed map was not practised by all children for they reverted to the old way of "looking at the map" as they called it.

Naturally the first location lessons took much more time than later ones because the children were less adept in using maps and because the later lists were shorter since the same places were frequently mentioned in the news week after week.

After all places had been put on the maps each week we decided upon the place or places about which there was most news and began to glean information from all sources at our command. Reports were given and discussions were held. The news story itself frequently told some historic facts about the place and we investigated those and followed other leads in addition to getting geographic facts about each place. An understanding of why the place made news was gained. For instance, the children undestand that because Poland is not protected by natural barriers and because it has desirable resources it feels it must prepare for war. They appre-

ciated Belgium's attempts at armed neutrality and began to realize how the struggle between two factions in Spain affect all Europe. But emphasis was placed on the location of these places and the juxtaposition of other places.

As I said before, the same places appeared in the news from time to time. This provided splendid opportunities for review. Frequently different cities in countries which we had studied were mentioned as when there arose the necessity of moving the seat of the Spanish government from Madrid to Barcelona or to Valencia. Altho we had learned about these places in our study of Spain, the children were more interested in the location and relative advantages of each over Madrid when the suggested move was made.

We found that the half hour allotted to our study was a very short time but the children did not stop studying at the end of the period. We could not find some places in the atlases and geographies we had at school so the pupils continued the search at home and all places were found eventually.

RESULTS

The results were gratifying. The children liked to use the maps, and most of them took pride in keeping them neat. They were interested in seeing the world map become our "known world" as each place studied was located there. They became more skillful in using all their materials, their vocabularies increased, as did their fund of geographical knowledge and their understanding of world problems became more comprehensive.

JUSTIFICATION

Now perhaps these results might have come from any other approach to the subject so I offer these points in theoretical justification of the course. In the first place, it is interesting and challenging for we study now the thing which is of interest now. I doubt if there be few people in the United States who do not know more about the Ohio-Mississippi River valley now than they have ever known because of the gripping news of the flood disaster last winter. They learned and will retain information about the place because it was of immediate and vital interest. The same thing is true of our study of "Current Geography." Then, too, the fact that all places studied are in the news of the world and are of immediate interest and concern to all people holds the course together and unifies it. We are not just inanely going thru a book nor are we

jumping from one corner of the world to another aimlessly.

In the next place there is a definite need for place geography. It is all very well to study regional and physical geography, the cold countries, the hot countries, the cotton belt, the wheat raising belt, etc., but the world designates these as countries, states, or provinces and not as regions and we need to know these political divisions if we are to visualize the relative position of places talked or written about. In our effort to emphasize the social and economic influences of physical geography we seem to have overlooked the fact that after all the very lives and destinies of people are controlled by political divisions now more than at any time in history.

This course enables children to become aware of the changing geography, such as the change of names of Iran for Persia and Ethiopia for Abyssinia. These changes could not be noted if we studied texts alone. Pupils are made conscious of differences in spelling of the same place as "Libia" and "Libya" and the preferred spelling such as "Yujoslavia" not "Jugoslavia." They learn of places not given in geographies as Lae in New Guinea, Kingsman Reef and other landing places for aircraft. This makes our course a changing, growing one, as courses of study should be.

Then lastly, there is one perfectly selfish point. This course keeps "teacher" from getting into too much of a rut for she, too, has to make lists, locate places, find new places and try to keep up-to-date.

AN EFFECTIVE PROBLEM METHOD

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For a number of years teachers of geography have been talking about teaching by problems. Thousands of teachers have tried it, but have found that they, and not the child solve the problems. The problem method needs no justification, pedagogical literature is filled with praise of its social implications.

Some of us forget, that the child must be taught to recognize a problem and its elements, before he is given problems to solve.

To teach the child to think of life and geography in terms of problems, the following four steps have been planned:

1. Introduce the child to problems.
2. Give the child the problem and the elements, then help him learn to find the details for its solution.

3. Discuss the material which would raise a problem in the child's mind by the presentation of certain information.
4. Let the children find problems by extensive reading.

Each of the above steps is given a semester. In this article the first part of the plan will be illustrated by the problem, "When we talk about climate, what do we mean?"

Adults like to name the new born child, children like to name the new dog or nickname their friends. Teachers of reading have capitalized on this desire. They have given children stories without titles, and by asking the child to give the story a title, they have been able to motivate better comprehension.

By a method analogous to the one used in reading, the child can slowly be led to the methods of problem solving. The method can best be illustrated by what is done. At the end of this teachers' introduction is a problem which is to be mimeographed or hectographed and distributed.

PRESENTING THE PROBLEM

With the mimeographed material in the hands of the child, the presentation is continued by asking the youngsters to recall, the time when they were very small boys and girls, who toddled along to the grocery store with their mothers. Once among the barrels and boxes, they would ask mother the names of this that and the other thing. Soon they knew something about the grocery store.

A teacher could continue in these words, "Here we have a question or a problem,—When we talk about climate, what do we mean?" Certain facts will solve this problem. One fact is discussed under each number. (See the problem at the end of this article.) Read the paragraph under number one and give it a name, if you can't think of a name the first time you read the paragraph, read it over again. If you still can't think of a name, skip it and go on to the next one. Then after you have completed the others go back to those you have skipped, and you will probably have a name in mind. Let's see who can give the best name."

To care for individual differences such as rate of reading and comprehension, at the end of the problem on climate the following have been placed:

1. What is a cyclone?
2. What does humidity mean, and how do they find out how much there is?
3. Make a rainfall map of the United States.
4. Make a growing season map of the United States.

To do these things the child will make use of the supplementary material and encyclopedias in the classroom.

THE SOLUTION IN ACTION

About thirty minutes gives all children ample time to read and name the work in climate. The teacher then asks for the titles chosen for the first paragraph. (For brevity only one of the titles given by the children will be given here.) The titles are written on the blackboard by the teacher. As each child gives his title, he is asked why he has chosen it. He may quote part of the paragraph. When five or six titles have been listed, the teacher asks the class to choose the title which best fits the paragraph. Here the content of the paragraph is digested and absorbed thru discussion. The spirit of competition is satisfied in the attempt to be the one to have the chosen title. The spirit of cooperation is developed in finding the most fitting name.

Each paragraph or groups of paragraphs is discussed and the title chosen. Let's say the titles chosen are:

1. Growing season
2. Temperature
3. Rainfall
4. Effect of a large body of water
5. Winds change rainfall and temperature
6. How the Weather Bureau helps us

The children can be shown that the above are the six facts which we talk about, when we talk about the climate of a place. These facts are the elements mentioned in the second step of the general plan. The children can readily be shown that the wealth of details surrounding the skeleton facts are necessary for the solution of the problem.*

PROBLEM: WHEN WE TALK ABOUT CLIMATE, WHAT DO WE MEAN?

When a farmer knows there will be no more frosts, he can plant his seeds. The kind of seeds he plants will depend upon the number of days in which there will be no frosts. In and around Milwaukee the farmers know that they can plant those things which will ripen

* Because it is necessary to use this type of presentation for a period of time, a series of problems like the one which follows will be presented in future editions of the JOURNAL.

in about 160 days. Around the Gulf of Mexico the farmers can plant those things which need about 260 days or less to ripen. In southern Florida and southern California the growers can plant almost anything, because they seldom have frosts, making the growing period there about 365 days. The length of time in which it is possible to grow crops is called the growing season.

2

Besides having a long growing season in Florida, it is always quite warm there. On the New England coast, it is as cold as it is in Milwaukee during the winter and as warm as in the summer. In the Adirondack Mountains it sometimes gets to be 40° below zero. This is because it is so far inland and so much farther north than Florida. So we have some places which are very cold, some not so cold and some very hot. When we tell about how hot or how cold a place is, we tell it by giving the temperature we find there. Therefore in telling about climate we tell about the temperature of the place.

3

If we set out a tin can to catch the rain that fell in Milwaukee every time we had a rainstorm, and melted the snow every time there was a snowstorm, and then measured all this water without losing any by evaporation, we would have a tin can between thirty and forty inches deep. It is important to know the amount of rain which falls in a certain place. We cannot grow rice in the deserts of Arizona, altho it may be warm enough. We could not mine borax in the valley of California, if it rained there, as it would all be washed away in solution. It was the right amount of moisture in the air that kept the cotton fibers soft in Manchester, England, making possible the large textile industry. So it is important to know something about the rainfall for crops and industry.

4

Places like northern Minnesota sometimes have temperatures as high as 102° in the summer and 50° below zero in the winter. But no places on the coast of Maine or Washington ever have such high temperatures during the summer because the cool winds from the ocean cools the land. During the winter it never gets so cold because the winds from the ocean are warmer than the cold land. Thus the ocean, or any large body of water like Lake Michigan, helps keep the temperature more even the year around. This climate is known

as. the "Oceanic climate." Milwaukee's climate would be more "oceanic" if the winds blew from the east instead of from the west as they do. Places like northern Minnesota are said to have a "Continental climate."

5

If we were to examine the trees in an open field, we would notice that more branches face the east than the west. If we would watch a weather vane for a number of days, we would soon see that the winds blow from the west or southwest much of the time.

If we examined a rainfall map of the United States, we would find over 60 inches of rainfall from central California to Canada, twice as much as in Milwaukee. The winds which come from the ocean carry a great deal of water. As these winds rise on the mountain slopes, they cool and therefore drop much of their moisture. The mountain slopes are therefore covered with heavy forests. But after the winds have passed over the mountains they are dry, because they again descend and are warmed, and have also lost part of their moisture on the mountain slopes. When winds are warmer they can hold more moisture, therefore, instead of watering the land they dry it. From the Rocky Mountains to the Dakotas, Nebraska, Kansas, Oklahoma and Texas the plateau and the vast plains have little rainfall because of the drying winds. These states have about ten inches or a third to one-fourth that of Milwaukee. Therefore winds are important in the climate of a region.

6

We would like to know if it is going to rain for our Sunday picnic or whether it is going to be colder or warmer so we can go swimming. On Saturday night we look at the paper and we can usually depend on the weather report found in our newspaper. How can the weather man tell us that?

From hundreds of places in the United States, the following facts are sent to about half a dozen main branches of the United States Weather Bureau: 1) The amount of rain which fell, if any; 2) The temperature; 3) The direction of the wind, its speed and the amount of moisture in the air in that place; 4) The condition of the sky; 5) The pressure of the air.

These facts are then put on a map. From this map, people who are trained in telling the weather, send their reports to the newspapers.

The Weather Bureau not only helps us on picnics, but warns

vessels at sea about storms, the farmers about frosts, the fliers about storms, and of approaching floods. The Weather Bureau not only saves many human lives, but protects our food supply.

THE OUT-OF-DOORS, GEOGRAPHY'S NATURAL LABORATORY

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Geography does not lie within the covers of any text. Unlike many other sciences, it always has its laboratory right at hand. For many years teachers have found profit and pleasure in introducing all ages of learners to the subject of geography thru the medium of the laboratory itself. The purpose of this paper is to help teachers recall the many opportunities which exist to make their work in geography or the social sciences more meaningful by using the out-of-doors.

Field work comes well within the scope of the Progressive Education Movement in vogue today. Many superintendents and supervisors are urging that a well rounded series of field trips be planned for the year's work. Such a plan carefully thought out, will aid the teacher in presenting and the learner in grasping relationships between life and environment which have hitherto been dry dull sentences. Planning the outside-the-school-room work for a year is more productive of efficient teaching than the hit and miss plan from day to day or week to week. One is often surprised how he can use the out-of-doors in establishing geographic concepts when a year's plan is carried out.

THE LABORATORY IN RURAL COMMUNITIES

Fortunate indeed is the teacher who begins her experience in the rural area. Close at hand, with no expense, with the dangers of taking children on trips often eliminated entirely, the rural teacher finds many opportunities.

In the autumn when the children come to school the problem of adjustment to the routine, which usually the three months vacation has helped them to forget, field work in the open will come as an excellent transition. Rural teachers find it convenient to group their pupils not by the traditional grade grouping, but according to mental development. Older children learn some fine lessons in citizen-

ship when given the responsibility in caring for a group of younger pupils. Sometimes, and naturally depending upon the size of the school, two or more such groups are organized each with an older pupil as monitor. If the pupils are permitted to have responsibility in executing these ideas they will come to think of the school as "My school," in which they become more and more an integral part. Instead of being bored, with dry listless attitudes, school, and education in general, will take on a new meaning.

DEVELOPMENT OF THE WORK

All out-of-doors work should grow out of class work. Pupils should be led to think of this work as a part of their regular school procedure, not as a picnic or Arbor Day lark! Hence the pupils and teacher should discuss together what they wish to see, in order to make some vague idea live. Many of the first trips should not be long especially if the children are young. For example, the writer attended a rural school in an easern state in his early years. Situated within the area of glaciated land, as all Northern states are, he once asked the teacher how the "hill" behind the school building came to be there. The teacher, after hesitating for a moment, replied, "God put it there." This kind of answer did not satisfy nor did it lead to further questions. For a number of years we tobogganed on the slope in winter, on home-made sleds, we "sailed" pickets on a brook, which was formed of waters from the hill. In our young imaginations we were first in Calcutta then in Bombay then in New York. Too young, with horizons too narrow to conceive where any of these ports were or what they shipped, yet, like Alice, who knew nothing about latitude and longitude, we thought they were grand words to say! So this "hill" played a very definite part in our young lives. When we came to study about "the great ice sheet" or glacier, no reference was made to the hill, to the rock strewn meadow across the road; the huge boulder anchored as a corner pillar to the school property was only a glorified "stone." On all the farms from which the boys and girls came, one of the tasks of out-of-school-hours and especially in the spring after plowing, was to help clear the fields of stones. The "stone-boat" was a necessary piece of farm equipment and the stone pile either in the center for convenience or in the corner of the field for efficiency was a familiar sight. But with each year's crop of stones, no mention was made as to how they happened to be there, or why we always had a fresh crop as the

years came. We left that school believing that stones, like Topsy, "just grew." Certainly the Creator took the hard way to revenge these young souls, if He "put them there!" Surely the "Wrath of Jehovah," heard once a week at church, had a far greater significance than did the work of the glacier which had deposited the material! In introducing (1) water power of New England, (2) fertile or unfertile soils of regions, (3) hydro-electric development, as at Niagara only a few miles away, (4) ease or difficulty in preparing the fields for crops, (5) presence of the famous Finger Lakes of the state and countless other topics could have been suggested by evidences and handiwork of the glacier which, by only looking out of the window, we could see every day.

USE CHILD'S IMAGINATION

About that brook which runs across the corner of the school property, let us see what lessons it offers for the energetic teacher. The location of many cities, large and small, is partly determined by the character of the river. Cincinnati, Cairo, Egypt, New Orleans, Calcutta, Para (Belem) are all located because of some influence of a river. Just as the brook came on to the school property, it made a great crescent-shape bend. We could see that the outer bend had high bluffs, that deposition has occurred on the inner side, that the current naturally took these pickets we were sailing to the side where the bluffs were, but in reading in our texts that Cincinnati was on the outer bend of the Ohio, situated on bluffs, were just mere dry textbook sentences. Right bank, left bank, silt, sediment, flood plain, shores and many other terms could have had a real meaning when we met them on the Rhine, the Yangtse, Mississippi, Congo or Amazon. Where this brook emptied into a river, it had built up large deltas, fine, evenly laid material in the shape of a fan. In the drier part of the year water entered the main stream over this delta in many small streams. But who would think of using child imagination to place a Cairo where these distributaries began or to notice the excellent cotton fields of the Nile delta on this fan-shaped formation! Why the Nile delta can produce such an excellent grade of fiber had no connection to this particular phenomenon. In the spring with the melting of the snow and results of frequent showers, the brook reached a width several times that of its normal size. In one place it had built a natural levee along its banks. Did the study of New Orleans and the problem its people have of keep-

ing water from their doors occur to us or the teacher? No! The textbook sentence, "One of the problems of the people of New Orleans is keeping water out of the city," was learned, recited or written back to the teacher and we received an "A" in Geography! More vague yet were the dykes of Holland. The heroic work of the Dutch in reclaiming and keeping their land for themselves, was a fact read about and when we piled up the earth to keep the water out of one corner of our baseball field, and hoping there should be no leak—no one saw any connection between the story we like to read or the actual work of these splendid people! As has been indicated in the foregoing discussion, many general truths and geographic concepts may be established with the younger pupils, to help give their reading deeper significance in later years.

Surely any teacher planning his out-of-doors work for any length of time, should first himself study the opportunities of the immediate community.

Along with these suggestions and thruout the year, pupils should be led to notice the lengthening and shortening of the day. This may be done by referring to home activities. Use of electricity or kerosene lamp at breakfast and the expense of oil or electricity as a result. Why do we pay more for our light in winter than in summer? Danger of doing barn chores by lantern light in winter could be well within the knowledge of many rural children and a good point of departure. The use of the shadow stick to observe the difference in shadow length. An old broom handle forty-eight inches long for easy arithmetical computation, set in a wooden block, serves very well. To have the pupils observe at least one day a month and make an accumulative record of these data on the blackboard or chart, increases the interest. Committees for each month may be appointed by the pupils and when finished at the end of the year, excellent material for oral or written themes in English may be an outgrowth. Certainly for younger pupils to grasp the relation of "high sun, short shadow and warmer weather" and its reciprocal "low sun, long shadow, cooler weather" some procedure of this kind seems necessary. Then for the older pupils the activities of people in foreign lands, as Sweden or Canada take an added meaning.

Practical Suggestions for Climate Study

Reading the thermometer, fastened outside, on the window and recording the daily readings in some permanent way helps to fur-

ther this concept. Every school ought to have an out-door thermometer as well as one inside for room temperatures.

Some form of rain guage, an empty can with a common rule, bringing and keeping record of the rainfall of the local area, helps to bring reality and meaning to the textbook descriptions and serves as a measuring stick in studying rainfall in distant places. Having the children gather their own data, make their own records (class or individual) and write their own conclusions seems excellent foundation for work later on, when more complex research comes. It builds up a confidence in his own abilities and suggests the right attitude toward work, so often present only in the minds of the most scientific.

For the older pupils, longer trips, and more complex relationships studied over a longer period of time can be accomplished. One group found it difficult to really understand the meaning of a textbook sentence, "Crop rotation is practiced." When they had finished recording the crops grown on certain fields on their father's farm, the difficulty vanished and they had really learned the true and full significance. Making simple maps of the farm as to use of the land each year over a period of years proved very interesting. The real meaning of *scale* of the map came when these pupils had paced off each of the fields studied and had drawn their maps.

Another rural school used a camera to good advantage. Situated near the edge of a deep and relatively narrow valley, this suburban school studied the transportation methods used by the moderate sized city nearby. Below them they found two railways, two paved roads, telephone and telegraph lines and an abandoned canal leading to a river. They took a picture of this scene. When developed each member had a copy and each told what the picture meant to him. When they studied the Rhine Valley as a unit, problems of cities along its banks had a wider significance. The text had reproduced a picture very similar to the one they had taken.

Without doubt the rural community offers many opportunities in aiding children to establish right ideas and concepts. Who could ask for a better laboratory, than Nature's own?

FIELD WORK IN JUNIOR AND SENIOR HIGH SCHOOL*

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The extra curricular program in junior and senior high schools provides the time and an opportunity for field work, a phase of geographic training which usually is neglected, in part at least, because of rigid school schedules.

In a geography club where the problem of conflict with class schedules is eliminated, the geography teacher can arrange to have her pupils gain some valuable experiences in observation, classification, and interpretation of landscape features. Altho there are numerous benefits to be derived from these experiences, there are two outstanding benefits, which, in themselves, would make these field activities worth while.

The first, is the intimate knowledge of the home community, the pattern of its functions and the problems which the community has faced and is facing in the carrying out of these functions. If the city is a large one, a well-planned series of trips to the various sections of the city, merely to note the landscape features which indicate specific functions carried on there, in the manner of a reconnaissance survey, is a good starting point. If the home community is a small town, this type of survey might be done on one trip. Even this rather cursory type of survey will raise, in the minds of the pupils, many questions about the localization of certain functions in their home community. An important part of this work is the teacher's planning. We did this sort of thing in Milwaukee and, if I may tell you what we did there, it may be somewhat clearer. Each student had a small street pattern map of the city which was used, at first, largely to help in orientation. Our first trip was to the harbor entrance from which we noted the general layout of the city and specifically the pattern of the commercial core. Here we saw wharves and warehouses, grain elevators, car ferry terminals, coal docks, coke ovens, several different kinds of factory buildings, and other evidences of the two major functions (economic), namely manufacturing and trade and specifically lake trade. In addition to

* Presented at the Geography Round Table, Department of Secondary Education, N.E.A., Detroit, Michigan, June 28, 1937.

the fixed landscape features, we saw the kinds of boats using the facilities provided by lake and river position—the large ore boats bringing in coal, car ferries on which trainloads of meat, for example, are carried across the lake and move on directly to help provide Detroit's meat supply. Another trip was to the Menominee River Valley where coal piles are more prominent than any other landscape feature. Three or four other trips to the sections of the city where special functions are carried on and to different types of residential use areas provided the basis for more detailed study.

A simple type of mapping of land classification can be carried on at the same time that this reconnaissance survey work is going on. We tried several different schemes, two of which were very satisfactory. The simplest was using a number code for classes of land use, such as 1 for manufacturing, 2 for trade, etc., and recording these numbers on the street map for blocks. The other was to make larger scale mimeographed maps of the area to be traversed each time and record the land classification in color, such as purple for manufacturing, red for trade, etc. In either case the data were transferred to our large wall map of the city which we used at our meetings in school when we analyzed our findings, discussed the problems, and brought what light we could upon the problems.

During the severe weather of winter when it was difficult to carry on the outdoor work, the problems were carefully studied. We called in well known authorities on certain problems to speak to us on some phases of the work. We had seen some of the port problems, for example, and invited a member of the harbor commission to speak to us on their work. The club members had learned to weigh facts and were critical of conclusions. For example, a boy asked a speaker who was speaking of the advantages to our city of the Great Lakes waterway, "What commodities do you think would reach our city over this route which do not come by lake boats now?" Among the items named by the speaker were oranges. The boy smiled and said as politely as he could, "Well, that doesn't seem significant to me. Wouldn't most of our oranges continue to be brought by railroad? During the winter months when we get a lot of our oranges, shipping on the St. Lawrence and the Great Lakes is closed."

The second important benefit comes in the application of the experiences gained from actual field work to situations where field work must be limited to getting the reality from pictures, maps,

graphs, and reading matter. For example, having seen outstanding landscape features which indicate functions carried on in Milwaukee and the site on which they have developed, students have less difficulty in visualizing city landscapes in other places. To be sure, grain elevators on the Buenos Aires waterfront are not identical with those in Milwaukee. However, the pupil who has seen those, who knows how the railroad cars bringing in grain are emptied on one side of the elevator, and how the grain is sent thru long spouts into the holds of large lake carriers has something to help him make real to himself the work in Buenos Aires in a high school study of world grain trade. At the same time his field work experiences have helped him to see the place of his own city in such world relations.

Not only the concepts of cultural and natural landscape features are carried to further study, but thru recording in map language their field experiences the pupils develop an appreciation for what goes into map making and a greater ability to translate map language back to the landscape features for which they stand. In the clubs we had in Milwaukee, we started out by learning how to make a simple base map for our use in mapping the neighborhood of the school. We made pace scales, by actually counting our paces. Using these pace scales we drew simple base maps of single blocks, then of a few blocks. On these maps each residence was noted by a dot at its appropriate place and in this way we had the beginning of a population map. These ideas were very helpful in understanding density of population. We also classified residential quality within the area and found ways of recording these data.

This spring, I spent several hours with my college freshmen doing just this simple type of field work. Altho I had been trying all year to help them see thru maps and pictures to the real things, I know from their comments, that these few actual field experiences probably did more than many hours of class room instruction. They not only learned many things that they didn't know about our small city of about 10,000, but they truly appreciated what maps meant. So, too, with pupils in the secondary school, here is activity in capital letters—a type of learning that is active thruout and which my experience has shown me is enjoyable and is profitable.

HIGH SCHOOL TRAVEL CLUBS*

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To direct the wanderlust that naturally dwells in the minds of adolescents, into purposeful educational channels by awakening curiosity about distant and alluring countries, is the primary aim of most travel clubs in the high school. Moreover, the careful guidance of members of travel clubs brings about a reality in the teaching of geography which is the aim of every good geography teacher.

I can offer you nothing that is startlingly new in the consideration of this subject of travel clubs. However, I can give you some ideas gleaned from my own experiences and those of others which I have seen put into practice, hoping that some of them may be new to you.

The organization of a travel club must be such that a real spirit for new adventure is experienced by the members. This calls for imagination and originality in everything from the naming of the club to the final program of the year. The group may decide to pretend that their travel club is an airplane, it then naturally follows that the president of the club becomes the pilot, the secretary, the co-pilot, and the program chairman, the stewardess. Similar organizations may be built around the idea of a boat, a zeppelin, a train, or a bus.

The club should belong to and be conducted by the students who form its membership. They should carry out their own original ideas purely for enjoyment. Nevertheless the faculty adviser should also be prepared with many ideas for activities which will help the pupils come to really know the countries they will discuss, to see in a vivid and realistic way the city and country life of their people, and to exchange the experiences they have had with other members of the club. Here are some devices which I have used from time to time.

I have found those tried and true educational and recreational devices such as lantern slides, motion picture films, field trips, travel programs, and pictures to be of great value. Not only do we use the motion picture films which are prepared for purely educational pur poses, but also the popular motion pictures that carry locales c

* Presented at the Geography Round Table, Department of Secondary Educatio N.E.A., Detroit, Michigan, June 28, 1937.

real geographic value. Such a one is "God's Country and the Woman," a story of the lumber industry in the Northwest, and "Elephant Boy," a movie of India, is another.

The reading and discussion of books about other countries is always another interesting and worthwhile activity whose value depends, of course, upon a wise selection of books. Guest speakers from the Field Museum of Natural History, with their excellent pictures, and consuls from the different countries are welcome to the travel clubs in our Chicago high schools. A good outside speaker is always acceptable to a travel club program.

But high school pupils are generally interested in preparing programs themselves. Hence we have certain meetings set aside for days of different nations when the pupils wear the native costumes, sing the national songs, dance the folk dances, and serve typical tidbits of the country of the day. All these things awaken a desire to experience in reality the things portrayed. Often otherwise indifferent pupils become interested in a particular country which has had its travel club day and do a great deal of subsequent reading about it.

Another occasion welcomed by all the members is Imitation Day on which the club members imitate figures public and otherwise whom they hope to meet on their trips. Still another group of days are those when the club travels in imagination with a certain type of character; they eat around the world with the epicure; they see the clothes of the world thru the eyes of the traveling dressmaker; they witness the games and pastimes of different nations as they travel with the sportsman. The artist, the musician, the writer, the statesman, the businessman, the workman, and even the hobo, can, in this way, give varying impressions of the world. The members are taught that they should see the world not thru the eyes of one of these characters only, but thru the eyes of all; so that when actual travel comes the members will be able to appreciate everything of interest and of value in our own and foreign countries.

We have found the presentation of skits to be a good device. These skits are written by members of the club. They portray life in different countries; the difficulties of traveling on trains, ocean liners, and airplanes; the problem of tipping and the selection of sensible clothing, among other things. In short, the club is taught proper travel etiquette, the knowledge of which is essential to any person who hopes to travel. Moreover, in these skits, from time to time, is demonstrated the contrast between a person who goes to

Europe having spent some time in intelligent reading about the countries before hand, and another person who finds himself suddenly transported into a foreign land where he feels ill-at-ease and where sight-seeing becomes irksome to him, because he was too indifferent to prepare himself by studying geography, reading travel stories, and by training himself thru life to ask the *why* of things. Then again skits satirize persons who travel by the menu, or by the nightclubs, forgetting that foreign countries hold things of cultural value.

Thru the club we hope to develop salesmanship, hence many of the boys represent steamship and railroad agents in talks before the group. These sales agents vigorously portray the advantages of certain trips and the great value of visiting certain countries. The recent coronation and the Paris exhibition formed interesting sales talks for pupils. To give these talks, preparation is necessary. The boys vie with one another to see who can sell his country most convincingly.

Individual interests and aptitudes should also be made use of. The juvenile stamp collector may display his treasures and add to the enjoyment of the group. Girls interested in dress-designing and sewing may make and model costumes of different countries, or better still design complete wardrobes suitable for different types of trips. Those who can write should be encouraged to submit travel stories and travel diaries for publication in the school paper. Artists can draw scenes of places they wish to go; musicians and dancers may like to share their gifts by presenting foreign selections for the entertainment of the club.

The closing activity of the year has always proved one of special interest to me. After the members of the club have read and talked about different places in the world, they are asked to select a favorite place which they would like to visit. Each member is allowed only one. A huge map of the world is drawn on wrapping paper by the club. Then each member either draws or pastes a picture of his favorite place at its location on the map and subscribes his name below it. The interest that this arouses is sustained even during the closing week of school when all are busy.

From the foregoing one can see that travel clubs have distinct geographic value. They are also of great social value to the pupils in-so-far as they teach them that true social intercourse with nations and with peoples is based upon a common interest and a mutual understanding of *how* and *why* people live and work as they do.

EXHIBITS OF GEOGRAPHY WORK

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Teachers of geography must plan to have materials suitable for "Open House" exhibitions, for it has become common practice in a great many schools to have these displays regularly. It is the purpose on these occasions to give parents and friends an opportunity to see what the actual work in the school is. Hence, it is essential that geography exhibits represent materials *used* by the pupils in helping them to gain geographic understandings, that is, understandings of relationships of man to natural environment. Notice that the word "used" in the foregoing statement is italicized. This is done advisedly as a warning against display of materials produced only for exhibition purposes.

Pictures, maps, grafs, and other geographic "tools" provide opportunities for interesting and attractive displays. Some of these materials which have been exhibited successfully in presenting to parents an idea of what the school is trying to give their children in the way of training in thinking geographically will be described.

WORK REGIONS OF EUROPE

In a double cycle course an eighth grade presentation of the geography of Europe had been conducted in units of work regions instead of units of political divisions. This was done partly as a time saving device. The class met only twice a week, and it had been found very difficult previously to complete the course by using political units. The pupils had been delighted with the plan, for they felt that it was on a much higher level than their earlier work, and they were anxious to show their parents how they had studied. In the center of the space set aside for their exhibit, a work region map of Europe was placed. This map showed by numbers the eight work regions, each of which had been the basis of one unit, a legend which gave the names of the regions, and surface features were colored lightly in green and in brown to show lowlands and lands above the 1000 foot contour line, respectively. The base map used was the 204 size of Goode's series of outline maps on which the 1000 foot contour line is indicated. The pupils had marked each region as it was studied on individual maps of smaller size, which were kept in their notebooks, and this larger map had been made at the same time by one

of the more capable pupils. In the class work the pupils had been led to discover from pictures and from product maps what the outstanding kind or kinds of work were in each region. Therefore, it was decided to display a few of the most typical pictures and maps for each region. For the Mediterranean Farming and Grazing Region there were pictures of sheep grazing, of olive groves, of vineyards, of orchards of citrus fruits, of fields of wheat as well as the appropriate maps taken from Geography of the World's Agriculture by Finch and Baker. For the Central European Mixed Farming Region the maps showing distribution of corn and cattle in Europe were used to bring out the outstanding differences between this region and the Mediterranean Farming and Grazing Region. Pictures of forest work, of dairying, of valley farmlands, and of mountain sheep grazing were selected to show the work of the Highland Logging, Farming, and Grazing Region. In order to show the leading branches of work in the Northwestern European Manufacturing and Commercial Region pictures of steel mills, textile factories, potteries, shipbuilding yards, chemical works, collieries, railroad terminals and yards, and port scenes were shown. The crop maps showing distribution of sugar beets, wheat, forage and root crops, rye, barley, oats, and potatoes were added to indicate the outstanding land uses of the Northwestern Farming Region and of the Russian Farming Region. Pictures showing logging, fishing, and a small clearing of farm land distinguished the Northern Logging, Fishing, and Farming Region, while a picture of a reindeer hunt suggested the Nomadic Fishing and Hunting Region. These mounted pictures and maps were placed around the work region map, and strings were fastened to the pictures and maps joining all those that belonged to one region and extending to the corresponding place on the map. In the class work the pupils had made climatic charts showing temperature and rainfall data for type stations in each region to help to explain the differences in land occupance. A set of these grafs was added to the display with strings extending from each graf to the region for which it was typical. To help to explain the importance and the distribution of manufacturing, data obtained from the Commerce Yearbook had been used to make cartographs showing production of coal and of iron and developed water power. These maps were then included in the display. As a summary exercise for the study of Europe, a map had been made showing the rank of the countries of Europe on the basis of their international trade and the pupils had written papers explaining the facts shown by the map.

One of these maps and some of the papers completed this display. A capable boy represented his class to explain to the visitors what the display meant.

UNITED STATES

A seventh grade class after completing a study of the United States exhibited the following. On an outline map of the United States carefully traced on beaver board the pupils showed various distributions with thumb tacks with different colored heads. Data[1] were obtained from the Statistical Abstract of the United States. Value of mineral production by states, value of manufacturing industries by states, production of cotton, wheat, corn, and other crops by states were among the distributions shown. The pupils were able to give many facts which helped to explain what they had shown. For example, they referred to maps showing length of growing seasons, annual precipitation, surface, and soil, which they had been in the habit of using, to help to explain to their visitors the crop distributions they had shown. Farm diagrams indicating how the acreage on type farms in various regions of the United States is divided among the different crops and farm buildings together with calendars of farm operations for each region, climatic grafs, and pictorial grafs showing how products are used were made during the assimilation period to help the pupils to gain understandings of the geographic personalities of the various farming regions of the country. Some of the more capable pupils made copies of these charts on a larger scale and in bright colors for the exhibit.

UNITED STATES AND ITS WORLD RELATIONS

In a study of the United States and its world relations the pupils transferred data concerning foreign trade from the Commerce Yearbook on to grafs and cartographs which became the basis of the study and which proved of unusual interest to the parents. Among the grafs used were those showing rank of countries in value of their foreign trade, principal commodities in export trade, principal commodities in import trade, and sources and destinations of these commodities. As an aid in the explanation of the trade facts, grafs showing rank of countries in size, in population, in percentage of land in crops, in production of wheat, of cotton, of corn, of coal, of petroleum, of iron ore, and of other products were made. Since time was an important element, the work of making the grafs was

[1] Most of these exercises could be carried out by children at a lower level if given sufficient help in handling the statistical data.

divided among the members of the class and the entire class had the use of all the grafs in the class presentation and explanation. Since the bar graf is the simplest to make it was the one used in most cases. Graf paper 18 by 27 inches was used, and the bars were made with glued tape which helped to lessen the time taken in making the grafs. This tape can be obtained in bright colors and the display can be attractive and colorful as well as very useful. Another class punched dots out of this same paper tape and used the dots on world outline maps showing the same data in the form of cartographs. An advantage of the cartograph was that the routes taken by the commodities to or from United States can be shown approximately, thus bringing out the high rank of our Atlantic ports. Pictorial grafs using bushel baskets, bales, oil tanks, dollar signs, or other appropriate symbols as *units* have been used to some extent. Here a warning may be in place. The mathematics involved in showing comparisons by relative size of two solids is too complicated to attempt that type of grafing with children. As a summary exercise for the unit on the United States and its world relations, the pupils made two colored maps, one showing rank of countries in value of our imports from them and the other rank of countries in value of our exports to them obtaining their data from the Commerce Yearbook. An explanation of the facts shown on these maps and grafs by the pupils gave the parents a good idea of how the children had been learning to appreciate our dependence on other lands for markets for our surplus products and as sources of materials needed to maintain our standard of living.

OUR STATE

After a reconnaissance survey of our state by a study of pictures of how the people are using the lands and waters of our state the pupils asked these questions: How does our state rank among other states? Which of these kinds of work engage the greatest number of people? Which produce the greatest income? How are they distributed? and What reasons for these facts can we discover? In answering these questions statistical data available in the Statistical Abstract of the United States and in several state publications were translated into bar grafs and isopleth maps; and maps showing soils, length of growing seasons, temperatures, rainfall, topography, geographic regions, cities, railroads, and distribution of crops and livestock were called into use. Among the titles of the grafs shown were the following, Rank of States in Amount of Developed Water Power, Rank of States in Value of Farm Products,

Rank of States in Production of Minerals, of Lumber, of Manufactured Products, of Dairy Products, etc., Number of People in State Engaged in Various Occupations, Rank in Value of Products of Various Industries, Rank in Value of Types of Manufactured Goods. In order to give a better picture of the distribution of people and of crops, the pupils were taught to draw isopleth maps showing ratios of population to area and of various crop lands to total crop land. Among the titles of these maps were the following: Ratio of Population to Area in Square Miles, Ratio of Land in Corn to Total Land in Crops, Ratio of Livestock Units to Land in Crops, Ratio of Milk Production to Land in Crops, Utilization of Milk. With these materials the pupils were able to explain to their parents many of the advantages and some of the disadvantages of our state.

OTHER DISPLAYS

A great many other displays of similar materials can be arranged as the direct outgrowth of the geography class work. Sometimes a unit may have been motivated by the construction of a graf before the class. For example, in introducing a unit on the Union of South Africa a rectangle had been drawn on a large cardboard to represent the area of the Union. Three pieces of colored paper had been cut out to the same scale to represent, respectively, the areas of Britain, France, and Germany. One at a time these rectangles were pasted on the large rectangle so that the pupils saw that the Union of South Africa is about the same size as these three important European nations together. Figures of little men had been cut out of black tape, each figure to represent 7,000,000 people. Six figures were pasted beside the rectangle representing Britain, six beside the French, and nine beside that representing Germany, a total of twenty-one figures. Then one figure was placed at the other side of the large rectangle to represent the population of the Union, thus bringing out strikingly its relatively sparse population. A graf of this kind could be built before the visitors by the pupils themselves introducing a trip thru the Union of South Africa, which they have planned, to present in a group of carefully selected pictures, which can be arranged and numbered to correspond to numbers appearing on the route indicated on an outline map. Grafs showing the value of the commodities in the export and import trade of the South American countries have been used as the basis for summaries bringing out the personalities of these countries. Carto-

graphs showing distributions of population, of crops, of livestock, of mineral production, of lumber products in the states of Australia formed a basis for a study of the country. The pupils' notebooks have been put out for the parents' inspection or pages from them showing organization of facts have been mounted and displayed. It seems unnecessary to describe any more of the materials which have been used successfully.

CONCLUSION

Some important teaching principles have been adhered to in the exhibit materials described. First, the materials all had a definite purpose and that purpose led to the attainment of a worthwhile geographic understanding. In some cases the original purpose was to motivate a unit by presenting disconcerting data which raised questions for study. Others had been made as an activity connected with the assimilation of facts needed in gaining the understanding sought. Of course, these activities representing manual efforts made up only a small part of the mental pupil activity required. Several exhibits represented materials which formed the basis of a testing device, an application of the unit understanding. Secondly, all facts were shown in such a way that they were an accurate and correct representation of the data. Altho the cartograph does not show actual distribution, it avoids the glaring errors so frequently found in pupil-made maps of product distributions. Again, the children *used* all kinds of maps showing natural phenomena, but they did not attempt to make inaccurate copies or enlargements of the excellent maps of this type supplied by text-books, atlases, and wall maps. The children did not make salt maps and other models[2] which are time consuming and which, at their level, the pupils cannot produce with accuracy and therefore the maps or models cannot make any real contribution toward the attainment of a geographic understanding. Accuracy is an important factor in geographic thinking and it is the teachers' duty to direct the activities of their pupils toward accurate and worthwhile results and not toward spectacular show or display. Thirdly, the materials not only made a contribution toward the understanding sought, but were used because they seemed the materials best able to make that contribution at the level

[2] The complicated mathematics and the many other skills required in making models may be realized by referring to Mrs. Viva Dutton Martin's description of the construction of an excellent, accurate model in *School Science and Mathematics*, January, 1932.

of these pupils, with the other materials available, and in the time alloted. Some textbooks supply motivation material, assimilation material, and application material and therefore it would no doubt be a waste of time to produce something else. At a higher level students may be able to draw the desired conclusions directly from statistics and so the time needed to make the grafs would better be used in another may.

Materials Used by the Pupils in Gaining Geographic Understandings is the slogan geography teachers may well adopt in planning for exhibits.

TESTS WHICH PROVOKE INTEREST

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Can testing be made a pleasant experience and at the same time dip keenly into ascertaining outcomes? Can this necessary exercise be made less of an ordeal without sacrificing any of the desired effects? In the press of everyday duties, we often teach better than we test because of the difficulty of testing for the complex outcomes involved in the ability to do sound geographic reasoning, and in the power to apply geographic findings correctly in dealing with concrete situations. To test for these attainments which are the goals of the kind of geographic instruction which is far reaching in its effect upon better citizenship in an intriguing manner is a real challenge to teachers of geography.

To build tests which will approach this ideal, one should first inject as much variety and novelty into the format itself, should next seek to make a minimum amount of written expression on the part of the pupil reveal a great deal of his insight, thereby avoiding fatigue and facilitating a larger sampling area and third, should above all make the inquiries genuinely purposeful by hooking them up to events and problems which occur in real life. Never has there been a time like this when global war activities and post-war planning make the possibility for such correlation so rich.

If available and practicable, the use of charts, maps, diagrams, sketches and especially pictures help immeasurably in putting together tests which are attractive and intriguing, but it is possible to achieve good results without them.

The following sample questions which have been found useful for Commercial Geography Classes at the tenth year level, are illustrative of what can be done to make tests revealing and at the same time help to dispel "grading-time gloom."

SAMPLE TEST QUESTIONS IN ECONOMIC GEOGRAPHY

I. Density of Population

You learned early that the population of the earth is very unevenly distributed. People live closest together where opportunities for many people to make a living are best and farthest apart where there are fewest opportunities. In cities chances for getting jobs are most numerous so cities are spots of "super-density" as you found out when you computed the number of people that live in the Schurz square mile.

1. A is the square mile we surveyed near our school. Put in the names of the streets which form its border. Why would it be impracticable to put in as many small dots as you would need to show the number of houses in this square mile? ____________

____

A

2. B is a square mile in Iowa. Compute the average density of Iowa: population 2,500,000; area 56,000 square miles. Put in as many dots (each to represent one *house*) as you would see as you flew over the square mile in an airplane.
(One house averages four people.)

B

3. C is a square mile in Arizona. Compute the average density: population 436,000; area 114,000 square miles. Put in as many dots (each to represent one *house*) as you would see as you flew over this square mile.

C

4. Insert A or B or C in each blank.
Important occupation(s) in places like
________ are likely to be manufacturing and trade
________ is likely to be farming
________ are likely to be grazing or mining or forestry

II. Two Problems in Sun Behavior

A. We read that rubber gathering in a Sumatra plantation, which is near the equator, begins shortly before daybreak, let us say about an hour. Check the time you think a rubber gatherer would start his work on these three dates. One is checked for you.

	March 21		June 21		Dec. 22
√	5:00 A.M.		2:30 A.M.		4:30 A.M.
	3:30 A.M.		5:30 A.M.		6:00 A.M.
	7:00 A.M.		5:00 A.M.		4:00 A.M.
	6:30 A.M.		7:30 A.M.		8:30 A.M.
	8:00 A.M.		9:00 A.M.		5:00 A.M.

B. Here are three "Black-Out" time lists lettered A-B-C, which appeared last August, 1942 on the front page of the *Bulletin and Scots Pictorial.*

BLACK-OUT TIMES

A.

	P.M.	*A.M.*
Glasgow	11:10	5:36
Edinburgh	11:06	5:31
Dundee	11:08	5:28
Aberdeen	11:07	5:21
Dumfries	11:05	5:36

B.

	P.M.	*A.M.*
Glasgow	11:12	5:34
Edinburgh	11:08	5:29
Dundee	11:10	5:26
Aberdeen	11:10	5:19
Dumfries	11:07	5:34

C.

	P.M.	*A.M.*
Glasgow	11:14	5:32
Edinburgh	11:11	5:27
Dundee	11:13	5:24
Aberdeen	11:12	5:17
Dumfries	11:09	5:32

a. Which one appeared on August 6?__________
Which one appeared on August 7?__________
Which one appeared on August 8?__________
What helped you decide?____________________________
____

b. Would you have to pull down your black shades earlier or later here in Chicago than they do in these Scottish cities? ______________

III. Two British Puzzles

Sometimes it is fun to solve a puzzle. These two were composed by a member of your class.

1. A passenger port in South England:
   The opposite direction of north + the upper hind quarter of a pig's leg + p + 2000 pounds.[1]
2. A tin-plating city in South Wales:
   Begins with an S. A graceful bird + a big body of water.[2]

IV. Our German Enemies

1. The more one knows about one's opponent, the better he is able to deal with him succcessfully. How much do you know about Germany?
Following are statements which supply information in part. You supply the rest by:
Marking (1) that completion statement which gives the *best* reason.
Marking (2) a completion statement which gives *another* good reason.*

[1] Ans. (Southampton)

[2] Ans. (Swansea)

a. Corn is not a common crop in Germany because:
________the growing reason is too short.
________hogs thrive better on root crops.
________the soils are not as rich as in our Corn Belt.
________people do not like corn dishes.

b. Rye bread is eaten more commonly than white bread because:
________rye does well in the cloudy areas of poor thin soil of northern Germany.
________only a small area in Germany is suited to wheat.
________the German people prefer rye bread.
________the German people do not care so much for pastries.

c. The Ruhr Valley Iron and Steel Business is one of the largest in the world because:
________it is close to many industrial cities.
________the Germans are good technical men.
________it is situated on the rich Westphalia coal deposits.
________it is easily accessible to the ocean by river and canal.
________it has been bombed frequently by the United Nations.

d. The great chemical industry developed in the Elbe-Saxony district because:
________of excellent rail transportation.
________the people there are highly skilled.
________the largest known world deposit of potash is found there.
________the Elbe River affords cheap, easy moving of bulky materials.
________of the large lignite coal deposits used for power.

e. The uplands of southern Germany contribute their share to the nation's economy by:
________providing sturdy warriors.
________making many kinds of saleable handwork.
________catering to tourists.
________buying many of the commodities manufactured in the northern cities.

f. Germany's rapid industrial expansion came about partly because of:
________the patience of its people in learning new arts.
________the numerous excellent technical schools.
________the existence of vital raw materials such as coal, potash, salt, etc.
________the use of fertilizer to improve the poor soils.

g. River and canal improvements and traffic are important partly because:
________four good sized rivers traverse the country from uplands to the sea to the north.
________there is no petroleum oil found in Germany so gasoline for trucks is very expensive.
________canal building is easy in the northern plain.

* The form for the first part of this exercise was suggested by "Tests"—Europe and Asia. Chicago: Silver Burdett and Company.

———distances are relatively short.

h. Germany's naval power has never been as great as Britain's partly because:
———the Germans are not good sailors.
———they got a late start. Germany as a nation is only seventy years old.
———they have only a short coast line.
———they are a home loving people.

2. Strike out the commodity(ies) which you think does (do) not belong in this statement:

At Duisberg, a busy Rhine River port at the junction of the Ruhr, one sees hundreds of barges moving downstream towards the ocean loaded with coal, coke, bales of cotton cloth, big packing cases of dyes, medicines, perfumes, dolls, cuckoo clocks, raw silk and corn syrup.

V. Iron and Steel in the News

If you are alert you will often notice bits of news in the daily papers which deal directly with the subjects of your school geography. The following news item was brought in a few days ago by a member of your class.

"Great Lakes Ore Cargoes in May Set All-Time High"

"Washington, June 3. (U.P.) Defense Transportation Chief Ralph Budd reported yesterday that the Great Lakes cargo fleet transported 11,081,199 long tons of iron ore in May, the greatest total in history."

1. Complete these sentences with a phrase of your own composition:
   a. The outstanding explanation for this all-time high in iron ore transportation thru the Great Lakes is ————————
   b. A sudden sharp drop may come at any time in the event that ————————

2. Check three reasons which best help to explain the increased ore demand.
———entry of the United States into World War II.
———increased production of farm machinery to produce more crops.
———increased employment.
———increased incomes.
———lend-lease of armaments to the United Nations.
———increased production of war materials.
———increased use of steel in construction work.

3. Check the reason(s) for the fact that next September is likely to see even a greater total than this May high.
———ore is then brought in anticipation of winter needs.
———rush to get supplies in before the lakes freeze.
———mine output is greater in later summer.
———wheat cargo vessels crowd the locks.
———cooler days bring added energy to workers

4. Fill in the blanks with the appropriate words:
This increased traffic of ore boats passing thru the Great Lakes, added to the usual seasonal harvest rush of ——— boats, is likely to cause serious congestion at the S——— canals.

5. Which of the following concerned people look upon this news with hope of victory or profit? Mark those (H). Which do you think look upon it with anxiety? Mark those (A).
———Stockholders in the Great Lakes Transportation Co.
———Stockholders in the United States Steel Corporation.
———Members of the St. Lawrence, Great Lakes Waterway Commission.

________Emperor Hirohito.
________Winston Churchill.
________Adolf Hitler.
________Exiled Queen of the Netherlands.
________Members of the Miners Union—Hibbing Local.

VI. Latitude, Longitude and the War

Fliers in the United States Air Corps and sailors in the United States Navy must know their directions on the globe. Knowing distances and directions also helps you to see the realities behind the news reports. How many of the following blanks can you fill in correctly?

1. Tokyo is at latitude 35°N and longitude 140°E. Suppose Major General Doolittle and his bombing squad had taken off from a base in the northern Philippines at latitude 15°N and 120°E. He would have flown in a general ____________ly direction.
2. Pearl Harbor is 20°N and 155°W.
   San Francisco is 38°N and 122°W.

   United States naval reinforcements leaving San Francisco for Pearl Harbor would sail in a general __________ly direction.
3. London is about 52°N and 0°.
   Berlin is about 52°N and 13°E.

   Luftwaffe from Berlin fly almost directly ________ when they bomb London.
4. If you remember that a degree of latitude is approximately 70 miles, it will help you with this last exercise.

   If Axis aerial bombers, released after the fall of Kiev (50°N-30°E) had been sent to bomb Cairo (30°N-30°E)
   (a) How far would they have flown?________________________
   (b) In what direction would they have flown? ________________________
   (c) *If one plane had been forced down at* Odessa (45°N-30°E) because of engine trouble, how far would it have already flown? ________________________

CONCLUSION

Each of the foregoing test exercises attempts to apply a specific geographic fact, generalization or skill to a real life situation or current problem in such a way as to make for lively interest. The ability to visualize population density is basic to an understanding of various types of land use and trade patterns. The first exercise tests for that ability. To actually put to practical use the principle of sun movement is the object of the sun problems. Will students remember that nights and days at the equator all the year around are twelve hours each, and that the sun always rises at six o'clock? A working knowledge of the world grid system too is a skill necessary to intelligent understanding of peacetime as well as wartime events. Have the students mastered this skill? The last question probes for that. Constructing tests such as these, which are varied and which are appropriate to one's own class needs, is a stimulating experience for the teacher. Answering them should be an equally intriguing one for the students.

A METHOD OF TESTING

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Of the various criteria set up by which geographic literature may be evaluated, those of "personality given to a region," and the use of the so-called "disconcerting data" are two which can be readily incorporated in a type of identification paragraph tests of landscape description and interpretation. The relationship theme is an essential part of the characterization.

The first group below, taken from a unit on Forestry and the second group taken from a unit on the Grazing Industry illustrate such a type of testing.

I. Forest Regions of United States

The following paragraphs describe the various Forest Regions of United States. In the blank before each number, write the name of the area described: Northern, Central Hardwood, Southern, Rocky, or Pacific.

_______________ 1. The violets, spring beauty, and sweet william blossom in the earliest spring while the warm sunshine reaches them between the bare branches. For soon the deciduous trees will shade the ground and then few flowers are found. Here we find the sprouting seedling of a stray nut that some squirrel planted last fall.

_______________ 2. But little timber has been cut and the untouched forests clothe the slopes. Probably this region will never be logged over to the extent that every other region in our country has been.

_______________ 3. Because of the enormous size of trees many new machines and methods of logging were invented. The lumberjacks found that here one tree made a train load whereas in their previous experience many trees were needed to make up a train load.

_______________ 4. The pioneer wanted farm land. So with his ax he rapidly cleared the timber. The forests were a menace and the fields were to be desired. Now corn and other crops wave in the summer breeze.

_______________ 5. The owner ordered that ten more acres of timber be cleared. He wanted to plant five acres of tobacco and five acres of cotton on the newly cleared area.

_______________ 6. Here the heavy rainfall and mild winters favor the growth of the most magnificent trees in the world. They grow tall, tall, tall. Here are stands of Douglas fir, cedar, spruce and sequoia.

_______________ 7. The spring comes late, the ground stays cool because of the covering of needles and the shade of the trees. Few flowers are found in these woods but rather the busy beaver, muskrat, and weasel.

_______________ 8. In this belt furniture and vehicles are made from the wood of the

nearby forests. Wagons and cars are needed in this level farm land to carry on trade and transportation.

______________ 9. Wood pulp is made from the smaller second growth. The many water power sites supply the means of grinding the logs, the streams and lakes furnish the fresh water needed to wash pulp.

______________ 10. Logging operations can be carried on the year round. These forests supply about a third of our lumber supply as well as most of the naval stores.

II. GRAZING

The following paragraphs tell about "BOY" who might live in the various grazing lands of the world. He helps his father tend the herds or flocks best suited to the type of pasturage available. Write the name of the country or area in which BOY lives in the blank space before the number of the paragraph.

______________ 1. BOY lives is a sod house. He and his father, who is a gaucho, herd cattle the year round. When BOY is at home he sits on a cow's skull for a chair. He likes to chew tasajo.

______________ 2. BOY hugged his coat closer about him as the cold July winds swept across the veldt. The locusts had eaten every spear of grass and the water holes were dry from the long continued drought.

______________ 3. BOY ran from the corral to his mother, calling, "The wind is shifting to the southwest!" This was good news for soon the cattle would be eating the self-cured bunch grass as the snow cover vanished.

______________ 4. BOY'S kinky head bobbed in and out among the animals in the stockade. He fed this mehari a date, and another a lump of salt.

______________ 5. BOY now had a pony of his own. Often he rode with the Cossacks across the brown dry pastures where tufts of grass were scattered far and wide over the bare ground.

______________ 6. BOY was chewing a handful of dry curds while watching the flocks and herds. Someday the mohair would be made into valuable rugs and then taken by long caravan routes to the capital city to be sold in the market place.

It will be noted that in each paragraph there are at least two words that aid in the identification of the region. These paragraphs can be read effectively, pausing a moment for the name of the region to be written on a paper which has been numbered. The number of descriptions for a unit can be as many as twelve or fifteen or more. Those given above are a few representative examples. The pupils will soon be making out similar characterizations.

Another variation of this same type is illustrated by the following combination of identification of industry and the associated area.

III. Industry and Associated Area

In the blank (a) tell what activity or industry is described, and in (b) tell where the place described might be located.

1. The men are busy setting traps and hauling in the seines for the "run" has started. Their work will soon be over and then the nearby factory will close down until the "run" next season.

(a) ———— (b) ————

2. The sun beats down from overhead. The heat is intolerable as the men pick their way slowly thru the underbrush trying to locate the scattered stands. The donkey engines tustle with the heavy loads that weigh down the tracks.

(a) ———— (b) ————

3. The chinook failed to come to their aid. The men rode out on their horses to save what they could and to dig out of the snowbanks those that had perished. The by-products would help to cover some of the loss.

(a) ———— (b) ————

4. With a hiss and a roar it leaped skyward. Those nearby were drenched with a black sticky fluid. Because of the fire danger, school was dismissed and besides the noises in the yard were too exciting to miss!

(a) ———— (b) ————

Answers

I.

1. Central	6. Pacific
2. Rocky	7. Northern
3. Pacific	8. Central
4. Central	9. Northern
5. Southern	10. Southern

II.

1. Pampas	4. Sudan
2. Karoo	5. Kirghiz Steppes
3. Great Plains	6. Plateau of Iran

III.

1. (a) Salmon fishing	(b) Pacific Northwest coast
2. (a) Forestry	(b) Panama or Amazon
3. (a) Grazing	(b) Great Plains
4. (a) Petroleum industry	(b) Oklahoma oil fields.

OBJECTIVE TEST IN GEOGRAPHY—SENIOR HIGH SCHOOL LEVEL

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This test covers a unit of work on the elements of erosion by wind, running water, standing water and moving ice. It attempts to get a measure of high school pupils' information about and understanding of the following concepts: the cycle of erosion, soil erosion due to man's negligence, and the relation of waste land to natural environment, to human activities and to present day economics.

In the test are elements of local physiographic interests which could easily be eliminated, such as Elk Mound outlier, the Humbird nunatak, the Flambeau Ridge, and Rib Hill at Wausau.

No attempt was made to validate the test, as it was a class project to test material covered in a unit taught in our demonstration school.

I. Match the following geographic terms with the correct number of matching statement from the second group.

——— 1. nunatak	——— 6. terminal moraine
——— 2. outwash plain	——— 7. hanging valley
——— 3. cirque	——— 8. drumlins
——— 4. outlier	——— 9. kames
——— 5. esker	——— 10. lagoon

1. Irregular heaps of sediment deposited at the point where a stream of water escaped from the ice margin.
2. A hill whose flank, but not whose top, has been eroded by an ice sheet.
3. A strip of stale, shallow water between the mainland and an off-shore bar.
4. A deposit formed by the accumulation of drift along the front of the ice-sheet.
5. Glacial hills, generally of clay, formed under the ice sheet at some distance back from its edge.
6. Name of the land-form characterized by an outcrop of young rock surrounded entirely by older rock.
7. A semi-circular hollow in the side of a mountain in which snow and ice gather to form a glacier.
8. Sharp, sinuous, winding ridges of sand and gravel deposited in stream channels on or under the ice.
9. A rich fertile land composed of fine particles washed away from the ice sheet.
10. A rather common glacial feature usually resulting in a waterfall.

II. The following statements are either true or false. When the statement is true, place a (0) in the blank before the statement; when false, place a (—) in the blank.

——— 1. Degradation is the erosional process of lowering the level of the earth's crust.

——— 2. Eskers are common features in the driftless area.

——— 3. A peneplane means "almost a plain."

——— 4. Maturity is the stage of erosion immediately preceding rejuvenation.

——— 5. Mantle rock is decomposed bedrock.

——— 6. Talus slopes and talus cones are usually in evidence in humid areas.

——— 7. Running water is the most effective agent in modifying the relief of the land surface.

——— 8. Ice ramparts are generally considered to be features of mountain or alpine glaciation.

——— 9. The Laurentian upland is a complex mountain structure, located in Central and Eastern Canada, that has not been subjected to the effects of the glacier.

——— 10. Glacial Lake Agassiz is a very productive farming area in North Dakota.

III. Complete the following statements.

1. Small isolated masses of rock along a shoreline are called ——— in Norway and ——— in Scotland.
2. Very deep wells that flow without pumping are called ———.
3. The most efficient agent in transporting mantle rock is ———.
4. At the mouth of a river, the alluvial plain may extend into a lake or a sea in the form of a ———.
5. When a land surface has been made as rough as possible and there is little or no level land left, it is said to be ———.
6. A bar built out from shore to deeper water is called ———.
7. A stream which has deepened its valley as far as possible and has smoothed out all rapids and falls has reached ———.
8. At the head of a delta the stream divides into ———.
9. Streams of stones moving slowly but continuously down a slope are called ———.

IV. Complete the following statements by underlining the answer that best completes the statement.

1. The Grand Canyon is an erosional feature of the (1) Hudson River, (2) Colorado River, (3) Wisconsin River, (4) Boulder Dam.
2. At Humbird, Wisconsin, there is a good example of a glacial feature known as (1) drumlin, (2) esker, (3) nunatak, (4) ice rampart.
3. The best state in which to search for evidences of continental glaciation is (1) Florida, (2) California, (3) Michigan, (4) Wisconsin.
4. The Laurentian Shield is located primarily in (1) Canada, (2) Samoa, (3) United States, (4) Australia.
5. Artesian wells are common features in (1) Washington, D.C., (2) Sahara Desert, (3) New York City, (4) North Dakota.
6. Braided channels are features of a (1) young stream, (2) dry stream, (3) mature stream, (4) mountain stream.
7. Talus is usually found in an area with a (1) cold, moist climate, (2) hot, dry climate, (3) hot, moist climate, (4) tremendous rainfall.
8. The ground water table may be expected to be closest to the surface in the (1) Gobi Desert, (2) Dekkan Plateau, (3) Tierra del Fuego, (4) Florida.
9. The bulk of glacial drift is composed of (1) water, (2) ice, (3) boulder clay, (4) igneous material.
10. The major stream draining westward in the United States is the (1) Hudson River, (2) Colorado River, (3) Columbia River, (4) Mississippi River.

V. Underline the geographic or physiographic term that does not belong with the others.

1. (a) esker, (b) marginal moraine, (c) sand dune, (d) kame.
2. (a) Mississippi River, (b) Orinoco River, (c) Ohio River, (d) Wisconsin River.
3. (a) hamada, (b) erg, (c) reg, (d) tombola.
4. (a) hook, (b) bay bar, (c) mesa, (d) spit.
5. (a) Caspian Sea, (b) Dead Sea, (c) Great Salt Lake, (d) Black Sea.
6. (a) limestone, (b) granite, (c) shale, (d) sandstone.
7. (a) tarn, (b) cirque, (c) glacier, (d) matterhorn.
8. (a) muskeg, (b) tundra, (c) swamp, (d) steppe.
9. (a) alluvial fans, (b) bolsons, (c) salt lakes, (d) playalakes.
10. (a) esplanade, (b) peneplane, (c) butte, (d) plateau.

SCORING KEY FOR OBJECTIVE TEST IN GEOGRAPHY—HIGH SCHOOL LEVEL

I. Matching

1. 2
2. 9
3. 7
4. 6
5. 8
6. 4
7. 10
8. 5
9. 1
10. 3

II. True-false

1. true
2. false
3. false
4. false
5. true
6. false
7. true
8. false
9. false
10. true

III. Completion

1. skerries stacks
2. artesian wells
3. running water
4. delta
5. maturely dissected
6. spit
7. base level
8. distributaries
9. screes

IV. Multiple-choice

1. Colorado River
2. nunatak
3. Wisconsin
4. Canada
5. North Dakota
6. mature stream
7. hot, dry climate
8. Florida
9. boulder
10. Columbia River

V. Terms foreign to the others

1. sand dune
2. Orinoco River
3. tombola
4. mesa
5. Black Sea
6. granite
7. glacier
8. steppe
9. alluvial fans
10. butte

PART THREE

ECONOMIC GEOGRAPHY

Economic geography is the geographical study of the production, movement and use of the world's major commercial products. The major aim is to orient the high school student in the world of commerce and industry. To accomplish this objective, the teacher must help the student to understand how the occupational pattern of the world and the production of the world's major commercial products are related to the pattern of the earth's natural resources conditions.

The subject matter of economic geography is organized in various ways. The most commonly used types of organization are: (1) the commodity scheme of organization; (2) the regional-commodity scheme; (3) the occupational scheme. In the commodity scheme of organization, ten or more major world commodities are studied. The leading producing areas are located, the natural and cultural conditions affecting production are described and the movements of the commodity from the producing to the consuming areas are traced.

In the regional-commodity scheme "each commodity studied serves a dual purpose, contributes an element of the world commercial pattern, and at the same time serves as a key to unlock the geography of a commercial region." This type of organization is, perhaps, more difficult than the commodity, but it gives the student a broader viewpoint.

The occupational scheme is based on a study of major industries or occupations: hunting and fishing, grazing and farming, lumbering and collecting of forest products, mining, manufacturing and trade. The geographic bases of the industry or occupation are studied, followed by a study of specific illustrations of the industry in various regions of the world where the particular industry is of major importance.

Each of these schemes of organization has advantages and also disadvantages. The teacher should follow the scheme of organization or a combination of types of organization which seems to suit the maturity of the students. The articles in this section represent various schemes of organization and the use of the local environment in the study of economic geography.

SUGGESTIONS FOR TEACHING A PHASE OF THE BANANA INDUSTRY OF CENTRAL AMERICA

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The teaching of geography has in recent years been placing greater emphasis on two types of techniques which are certain to enhance its effectiveness. These two types are: visual presentation of geographic information, and the use of field work as an introduction to geographic problems.

The following outline for teaching a phase of the banana industry of Central America is offered as an illustration of the use of these methods at the junior high school level.

I. Interest lead
   A. Take the class to a fruit market, or designate a small committee to interview the manager of such a market. Secure answers to the following questions:
      1. Are there any common fruits which may be had fresh, and in prime quality, the year round?
      2. What is the source of these fruits?
      3. What steps are taken by the market to protect the freshness of these fruits?
   B. Discuss the data thus secured, with the class
      1. Oranges and bananas may be had fresh, the year round.
      2. Oranges come from California and Florida. Most bananas come from Central America, but others come from Mexico, Cuba, Colombia, and other nearby tropical lands.
      3. Bananas thus must come a much greater distance to our markets than oranges. (Have class use map scales.) Bananas must use water transportation over much of the way. Bananas are much more perishable than oranges, hence the supply of bananas needs frequent replenishing, because stocks must be maintained at a minimum.
   C. From the foregoing there arises the problem: How is it possible to keep our market supplied constantly with such perishable fruit, especially since it must come so far?
      The problem involves two elements:
      1. How is such perishable fruit kept fresh?
      2. How is a constant supply kept on hand, when obviously the fruit cannot be stored?

II. Activities essential to the solution of the problem

The best method available to meet this situation is that of selecting readings for individual reports by members of the class. For this purpose, the following sequence of topics is proposed, with suggested sources of material for each topic. References suggested are by no means the only ones available. Those not available in your local library, and for which you are unable to find substitutes, may possibly be secured from state libraries. (It would be advisable to assign the class as a whole the responsibility of finding, in the reported material, six facts which throw light on the problem they are trying to solve.)

A. Map of banana producing area in Central America. C. F. Jones, *Economic Geography,* p. 115.

This map may easily be copied on the blackboard, using bright colors to indicate significant data. The map reveals the first glimpse of the solution of the problem—the fact that the banana plantations are located on coastal lowlands easily accessible to the sea. (Incidentally, the map reveals many data concerning the kinds of lands where bananas grow.)

B. Following the discussion, perhaps occupying a separate class period, the teacher may present a good photograph of a growing and fruited banana plant. (Sources of such pictures are many. Fruit companies, Keystone slide No. 294, 1930 edition, the National Geographic Society, Washington, D.C., are among available sources.) It would be well to select a picture having in it a man, in order that some idea of the height of the plant may be gained.

Points which need to be stressed in the discussion accompanying the picture presentation:

1. The bunch of bananas is at the top of the stalk, and commonly is over twenty feet above the ground. A bunch of bananas frequently weighs as much as 100 pounds.
2. The stalk grows from a cutting in a little more than a year. The stalk, therefore, is fleshy and weak.
3. Storms are frequent in Caribbean lands. Since the banana plant is so constructed as to render it highly susceptible to strong winds, and since plantations must be near the coast and preferably on lowlands thus laying them open to high winds, fruit companies have had to select sites for plantations which are not frequently visited by storms accompanied by strong winds.

(It may be said by some proponents of "Child Activity" that the teacher should achieve all her ends thru this medium. Let it be noted that forceful presentation of colorful data such as the foregoing will be accompanied by much activity of mental character by the class.)

C. Map of a banana farm in Costa Rica. C. F. Jones, *Economic Geography*, p. 114. This map may also be enlarged on the blackboard. It will reveal a second factor in the solution of the problem—that banana farms are characterized by well-organized transportation systems. Tramway networks supplemented by muleback transportation between tramways, facilitate rapid movement of fruit from all parts of the farm to the main railway, which in turn leads to the port city. All tramways on the farm are directly tributary to the main railway.

D. The discussion relative to the layout of a banana farm may well be accompanied by a discussion of the activities carried on thruout the year on such a farm.

For this purpose the following reference is suggested: (Usable as a basis for teacher or pupil presentation.) Colby-Foster: *Economic Geography for Secondary Schools*, pp. 67-69.

This reference presents a graph of temperature and rainfall conditions in banana lands. The graph might well be placed on the blackboard, or the data from it dictated, and the class given some experience in graphic presentation of geographic data.

These data reveal the fundamental reason for the constant supply of bananas. Temperature and rainfall conditions being fairly uniform thruout the year, plantings may be so arranged that some fruit is ready for harvest at all times.

E. Equipment of the ports: (Alternative reference given.)

McConnell: *Living in the Americas*, p. 275

Atwood-Thomas: *The Americas*, p. 244

This material advances the problem one step further towards its solution. Port equipment is highly developed. Modern machinery makes loading and unloading operations very rapid and efficient.

F. The Nature of a banana ship.

Colby-Foster: *Economic Geography for Secondary Schools*, pp., 60-61

This report will bring out the following facts:

1. Banana ships are built for speed as well as carrying capacity.
2. These ships are equipped with both heating and refrigerating equipment, in order that all weather emergencies en route to market may be met.
3. Because of the speed of the boats, passengers frequently travel to Central America on them. This source of revenue helps pay the cost of the banana journey.

G. America's leading banana port.

J. R. Smith: *American Lands and Peoples*, p. 118

This brief source makes clear why New Orleans leads as a banana port, the reason being that much of interior United States may secure its bananas more quickly thru this point than thru any other.

H. It is advisable at this point for the teacher to conduct a summarizing discussion, out of which will emerge the following facts, each of which helps solve the problem upon which this series of exercises is based:

1. The banana producing areas have been developed near the sea on accessible coastal lowlands.
2. A banana farm has a highly organized transportation system, which is tributary to railways leading to port cities.
3. Banana exporting ports are equipped with radio stations for receiving news of the coming of banana ships. Exporting and importing ports are equipped with machinery which greatly speeds up the loading and unloading process.
4. Banana ships are fast-moving craft. They are equipped with heating and refrigerating apparatus, in order to correct for temperature changes encountered en route to market.
5. Banana lands have a year-round growing season, with heavy rainfall every month. For these reasons, the banana plant knows no season, and some fruit is harvested every week of the year.
6. Bananas destined for the various parts of the United States are imported thru several ports. New Orleans imports more bananas than any other, because a larger part of the United States may be served quickly from this port than any other.

It is for the foregoing reasons that fresh bananas may be found in our market at all times of the year.

THE USE OF THE FIELD TRIP IN TEACHING A PHASE OF THE STEEL INDUSTRY AT THE SENIOR HIGH LEVEL

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In recent times, we have been demanding more geography in our schools, and, particularly, in the senior high school. The war has made this demand a reality within our grasp. Parents are now convinced that we need more geography, but have we convinced the student?

Need for Effective Teaching

Now, more than ever, we need to make the teaching of geography effective! This kind of teaching demands that it should be real, or become meaningless in the eyes of the student. He can see the factories, retail establishments, railroads, and other cultural or natural features of the environment in his community, but the varying natural and cultural features in other regions of the world must, in most cases, be secured thru reading and the study of maps, graphs, or pictures. The use of the local area can be used to stimulate the original interest, and the ensuing enthusiasm transferred to more distant places in the world.

One way to make geography real is to turn to the local community as a source of study. It is of paramount importance to recognize and comprehend the local geographic picture as fundamental in the understanding of the community. These same geographic recognitions and understandings will serve to develop a type of thinking which can be adapted, later, to a better conception and understanding of the world regional pattern.

Students entering high school bring a resentful attitude toward the subject. They remember the useless memorizing they had to do; the recalling of figures and facts; and the meager understanding they had after finishing the course. This attitude is a direct result of the shortcomings of courses in the teaching of geography. They dwell too much on generalizations rather than cases, and leave the student with abstract ideas but nothing tangible. Teachers are concerned with the materials in the text to such an extent that it becomes the sole factor in the experiences of the students. It would do well for teachers to look beyond the four walls of the

classroom and to teach more about things just outside their classroom window.

An industrial community, such as Massillon, offers a wealth of geographic teaching materials which can be utilized to stimulate interest. Altho not all communities can present an extensive list of features to observe, each has some features which could be used as a source of interest. An observation of the local landscape introduces the student to something real, something he has in part experienced, and this experience can be used to develop that type of organized thinking characteristic of the subject. Viewing an industrial process, or the transportation pattern, or the industrial pattern seems to interest students to look for "reasons why" which, ultimately, lead him to a study of natural environmental factors, cultural environmental factors, or factors involving the nature of peoples. Thus, we have reached our major aims in geography.

PREPARATION FOR THE TRIP

The following trip will illustrate how a visit to an industrial establishment may be made to function in achieving some of these major aims of geography teaching. However, just viewing an industrial process is not enough if we are to attain our objectives. Unless one has certain specific factors to look for, based on some past thinking, the trip is useless. The student must be prepared to look for certain things and to seek the answer to specific questions. To this end, we had made some study regarding the steel industry in its general setting, the coal regions, and their relationships, as well as the story of Mesabi and the Great Lakes in the movement of iron ore prior to the field trip.

In a class period preceding the visit, a list of things that we wanted to see was made, which included such items as the blast furnace, ore piles, coking plant, open hearths, and rolling mills. Next, a list of questions was made which included the following: How are the raw materials for manufacturing secured? How is the plant located with reference to lines of transportation? What is the outlet for the by-products? How is the furnace charged? Why is stainless steel production emphasized at Massillon? What markets does it supply? Why was it established at Massillon? These suggestions were made by the students and each made a copy for the trip.

The problem of conducting a large group of students on such a

trip has many aspects. If a teacher has a large number of students it is impossible to take them thru at the same time, but an arrangement can be made whereby a small representation from each class is chosen and they be made responsible to report their experiences to the rest of the group in post-trip class periods. This arrangement also works in a situation where the industrial management objects to large groups going thru the factory due to the risks from injury such as one might encounter in a steel mill. However, the objection that the mill management had to field trips by large groups during the war has now disappeared and they are making definite plans to build observing platforms at important or interesting places where large groups can view the operations with safety.

When classes are small, the above problems are erased so that the entire enrollment can be divided into smaller groups. In our particular case we had two groups of thirty each, which proved to be a very satisfactory number to conduct on such a trip.

OBSERVATIONS IN THE FIELD

The first step was to note the location of the steel mill which is along the west bank of the Tuscarawas River just south of the city limits. The railroads which serve the plant follow the flood plain of the stream. Two main lines, the Baltimore and Ohio, and Wheeling and Lake Erie, as well as a spur from the main line of the Pennsylvania, which was built to service the plant, use this natural roadway.

Our second step was to examine the workings of the blast furnace, where we watched the process of loading. There is a deep fascination in the workings of the car which carries raw materials to the top of the furnace. The ore comes, in great part, from the Mesabi range, but other ores are added from districts in Michigan which contain essential minerals used in making special steels. Coke for the furnace comes from their own coking plant which takes advantage of cheap Middle Appalachian coal brought in by the Wheeling or B. & O. lines on their return trip to Lake Erie ports for iron ore. These same lines also bring, in addition to the ore, limestone from the Lake Erie ports of Cleveland, Lorain, and Huron.

We observed the process of drawing off the molten metal which is carried in giant ladles to the nearby steel mill on the corporation's rail line. That part of the metal which cannot be

used at the time in the mill is poured into molds and stored in bins for future use. Recently, there has been a sharp drop in the production of the blast furnace due to the increased emphasis on stainless steel, and the tendency is toward the elimination of this phase of the industry from the Massillon plant of Republic Steel. Future supplies of steel will probably come from the Canton plant where electric steel is made, and which supplies part of the Massillon plant's needs now; and from scrap metals.

Before viewing the wonders of the open hearth, the group noted the storage bins containing the various minerals used in producing the high grade stainless steel. Among these minerals were tungsten. chrome, molly, nickel and vanadium. We were now ready for the most interesting part of the trip.

There is something awe-inspiring about the "open hearths" which provide a spectacle that no student will soon forget. We were fortunate to observe the loading of one of the furnaces and noted the various proportions of minerals that are thrown into produce a certain type of alloy steel. Then, in an adjacent furnace, a heat was poured into ladles, which in turn were hoisted, and the liquid metal poured into ingot molds. To experience this process is one of the real dramatizations in the field of geography.

We learned that the production of stainless steel was the life blood of the Massillon industry at the present time. The making of sheet steel used largely by the automobile industry has been, for the most part, transferred to the continuous strip mill built by Republic on the Cuyahoga River at Cleveland. Only surplus orders, or ones too small for the Cleveland plant to handle economically, are now made at Massillon. The real emphasis is on stainless steel, and there have been two expansions in recent years, with another in the process of construction, replacing the armor plate division. A great variety of products are now being made, including wire for trimmings on automobiles, and stainless steel sheets.

The final step in our trip was to follow an ingot thru the rolling mills. We watched its miraculous journey thru the rolls until it assumed, by means of reduction, the proportion of a thin rod of wire.

CLASSROOM SYNTHESIS OF THE TRIP

However, the most important part of the trip came with the follow-up that was made in the ensuing class periods. The group carried out a question and answer program in which many of the questions left unanswered were discussed. They sought the answers

from readings, plant officials, and the local Chamber of Commerce. Then, each student prepared a paper summarizing the information on this phase of the industry and its relationships to the total picture. The concluding exercise was a map showing the sources of raw materials, lake ports, railroads, and similar industrial communities.

CONCLUSIONS

There were several indirect, but important results from this work. Interest had been stimulated to such an extent that a study was made of the industrial pattern of the entire community and the relationships shown on outline maps of the city. Second, the student extended this study procedure to include the larger pattern of the industry both nationally and internationally. Finally, they undertook individual projects to examine the geography of the steel industry in other communities. The benefits derived from a first hand study of the local area facilitated the adaptation of their thinking to larger and more remote areas.

There are several immediate results obtained by means of the field trip. First, an understanding of the local steel industry, its relation to the other activities of the community, and its importance to the life of Massillon. Also there is an understanding of the relationship of the pattern of the local steel industry to that of the larger steel pattern of the United States, and of the world. Next, there is acquired an intimate knowledge of the students' home community, the pattern of its functions, and an awareness of the problems of that community, together, with an appreciation of why they exist, as well as a partial background for their solution. Third, there is developed a concept that geography is not something that exists on distant horizons, but is to be found in their own backyard.

In addition to these results, there are some ulterior benefits to be derived from the field trip as a supplement to regular classroom work. According to certain modern educators, "the direct and concrete first-hand experience offered thru educational trips seems to speed up teaching and make it easier. Also, it tends to foster quickened interest, clearer thinking and greater retention of material." One of the big causes of failure in geography is the lack of concrete geographical experiences. Students, who do not possess a fair knowledge of home geography, or possessing it, do not use it to acquire an understanding of world relationships, are more likely to fail. Finally, the experiences derived from the trip are an aid to future travel.

AN EXPERIMENT WITH THE CONTRACT METHOD IN HIGH SCHOOL COMMERCIAL GEOGRAPHY

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Illinois State Normal University, Normal, Illinois

The school as an institution is an organized effort of society to pass on to succeeding generations the experiences and ideals that have been found valuable to the race. In the transmission of these experiences and ideals the school aims to develop the mind of the child so that he may use his knowledge of racial experiences intelligently and advantageously. It is also hoped that he may be inspired to use his intellect in such a way that he will add something to the sum total of the world's worthwhile knowledge. The teacher is society's agent for the passing on of racial experiences. It is the teacher's objective to convey this information and to develop skills, attitudes, and appreciations in the child as rapidly and efficiently as possible. The more efficiently this is done the fewer years of the child's life are required for preparation. Here is the crux of the teacher's problem. Youth does not always see the value of certain information, skills, attitudes, appreciations, and participations. Thus the child wastes his time. There has ever been, and probably always will be, a constant struggle for the teacher to get pupils to want to know what the teacher as a representative of society thinks they ought to know. Around this problem have developed most of the methods of teaching.

Problems of arousing interest, motivation, tests, marks, competition games, honors, and what not, are all devices to get the pupil to desire to know or do something society thinks he should know or do. These efforts on the part of teachers and educational leaders have led to the development of a number of newer approaches to the problems of classroom procedure. Some of these are similar or have elements of similarity. Those more prominently known are, "The Case Method," "The Dalton Plan," "The Unit Plan," "The Winnetka Plan," and "The Contract Method." All of these newer methods aim at greater economy in the learning process and higher efficiency in classroom procedure. The purpose of this discussion is to describe one way of using the Contract Method, and to evaluate some of the advantages and disadvantages of the plan.

The Contract Method is supposed to remedy what we all recognize to be one of the chief defects in teaching, namely, that of trying to make a pupil learn when the teacher is ready for him to learn, instead of permitting him to learn when he is ready to do it himself. This situation is a natural and perhaps inevitable result of group instruction. Since group instruction is necessary if education is to reach the masses, it is worth while to find a remedy for such a situation if possible. The Contract Method, simply stated, is to give a child a definite task to do and to permit him to do it when he wants to, within certain set limits, the teacher aiding when the pupil needs help.

Such a method assumes certain things: (1) That the pupil understands clearly what is to be done and accepts the responsibility for doing it. (2) That the unit of work is definite and well organized. (3) That there is a well written body of literature on the unit. (4) That such literature is within the reach and comprehension of the child. (5) That duplicating apparatus, such as mimeographs and other duplicating machines, are at the disposal of the teacher. (6) That the teacher has time for the extra work involved. (7) And, finally, that the teacher has analyzed the situation carefully and knows what he is doing.

The following Contract is one of a series used in a Commercial Geography class in the high school of the State Teachers College at Whitewater, Wisconsin. There is one departure in procedure from that used generally. The pupils were not asked to write out a large amount of material but mastery of subject matter and grades were determined by objective tests. The purpose of this change was two-fold, namely, to save time for both the pupil and the teacher. Mimeograph copies of the Contract were placed in the hands of the pupils and at the completion of the study the accompanying test was given. This Contract is developed on the three-level basis.

CONTRACT: PETROLEUM AND NATURAL GAS

Commercial Geography, Tenth Grade

Time, 2 to 3 Days

"Petroleum resources have now become the most important measure of a nation's strength. There was a time when territory was the principal object of competition among nations. Wars were fought for it. Today the greatest, the most acute competition

among nations centers around oil.

"All our means of transportation and communication, our trains, steamers, motor cars, aëroplanes; all the machinery that has made possible large-scale production and the consequent saving of human effort and increase of the world's wealth; all labor-saving devices in the home—all the things that have added so much to life's comfort and pleasure during the past few decades would not have come if it had not been for oil."[1]

From the above quotation it is clear that petroleum is an important commodity to much of the world. Why is petroleum so important to the world today? How abundant a supply has the United States? How are we prepared to meet the competition of foreign nations? What are we doing to secure our share of the world's reserve of petroleum? These are problems and questions that concern all of us. If you work carefully thru this Contract, you should be able to answer them intelligently.

I. General References
   1. Whitbeck, R. H., Industrial Geography: 168-177
   2. Smith, J. Russell, Commerce and Industry, Revised: 214-244
   3. Chamberlain, J. F., Geography—Physical, Economic and Regional: 320-325
   4. Ridgley, D. C., Economic Geography Notebook: 62-63

II. Introduction
   1. This has been called the "age of petroleum." What justification is there for this designation? Is it true?
   2. Write a list of as many uses as you can of petroleum and petroleum products. Smith: 214, and Whitbeck: 171-172. For which of the uses can you suggest a substitute? Write the name of the substitute after the name of the product. For what ones can you find no substitute? Hand these two lists in at the first recitation period in the study of this Contract. It is estimated that the supply of petroleum in the United States will last but ten or fifteen years. What shall we do for these products then?
   3. How does petroleum occur in the earth? Is more forming so as to affect the dearth that appears to be ap-

[1] Leo Pasvolsky, Civilization and Oil. *Atlantic Mo.*, vol. 131:167.

proaching? Read Whitbeck: 168, and Smith: 216. How is petroleum obtained? Give a full description of how an oil well is drilled. Smith, Figure 135. How is the oil stored? Figure 100 in Whitbeck and 134 in Smith. Why are earth reservoirs used at times instead of tanks?

III. The Petroleum Industry of the United States

1. What are the seven oil fields of the United States as shown on Figure 101 in Whitbeck and page 63 of your notebook? Write the names of the various fields on the map on page 63 of your Notebook. Read pages 169-171 in Whitbeck, and 216 and 217 in Smith.
2. Which of these fields is the oldest? See Figure 133, Smith. Which one is the largest producer now? See Notebook: 63 and Chamberlain: 322 and 323, and Figure 133 in Smith. Has the production of these fields changed materially since these books were written? Which of the fields are nearly exhausted? Find the latest statistics possible in such publications as the United States Geological Survey reports and the World Almanac. From the graf, Figure 133 in Smith, make a statement that is applicable to the history of production in all fields. What does this mean ultimately for the petroleum supply of the United States?
3. Name the three chief ways by which petroleum is transported in the United States. Read pages 172-174 in Whitbeck, and 219-220 in Smith. See Figures 102 and 103 in Whitbeck. Which method is most important? Why? Why are different methods used for transporting petroleum than are used for transporting coal? What influence does the method of transportation have on the price of petroleum and its products. Why is much of the petroleum transported to refineries near New York and Chicago before it is refined? How does Figure 138 in Chamberlain show a great loss in the oil industry? How can this loss be prevented?
4. How is petroleum refined? See Smith, pages 223-224. How many different products are obtained? Write a list of as many as you can. Which of these products

have been increasing in importance? What has been done to obtain greater quantities of some products? What of the future?

5. What is the relation of natural gas to petroleum? How is it produced? In which fields is gas production important? Why has much of it been wasted? How is it formed? What future possibilities of use has it?

IV. Petroleum in the Rest of the World

1. What are the important producing countries besides the United States? Notebook: 63, Chamberlain: 323. Write the names of the countries in the appropriate location on the map, page 63 of your Notebook. What change in production has occurred since these books were published? See Whitbeck, Figure 105. Can you find later statistics? What trouble has occurred in the Mexican fields in recent years? How is this important to us? Where is new production developing not shown in the books? What proportion of the world's production of petroleum is supplied by the United States? Will this situation continue in the future?
2. To what countries does the United States send petroleum products? See Smith: 224 and Whitbeck: 174. How is it exported? From what countries do we import? Are imports or exports greater? What will be the situation in the future?
3. Answer the questions at the end of the chapter in Smith and in Whitbeck.

V. Place Location

Locate on the map, page 63 of your Notebook, the following places which are important in the petroleum industry. Write opposite each what it is important for in the petroleum industry. Baku, Tampico, California, Tulsa, Galveston, Whiting, Caspian Sea, Persian Gulf, Mesopotamia, Borneo, Sumatra, Port Arthur, Burma, Pennsylvania, Maracaibo, New Jersey.

"B" Level

If you have mastered satisfactorily the "C" level Contract, read the article in Compton's Pictured Encyclopedia Vol. 7: 2749-

2755. If you master this satisfactorily you will receive a "B".

1. What were some of the early uses of petroleum as given on page 2749? Describe the first oil boom and note how it changed the use of petroleum.
2. From a study of the pictures on pages 2749, 2750, 2751, and 2753 describe how petroleum is produced.
3. Study carefully the picture on page 2751 and draw a diagram and hand in, showing how oil occurs in the earth. Indicate where a "dry hole" might be drilled.
4. From the map on page 2752 write a list of the countries having large petroleum reserves. List them in the order of magnitude of the reserve in so far as possible. How does the United States rank? Compare with page 220 in Smith. Hand the list in.
5. Where is the "world-wide struggle for oil" taking place? Page 2755. Why is it regarded as a serious struggle?

"A" Level

If you have completed the "B" and "C" levels read one or more of the following magazine articles and hand in an outline of each and be prepared to give a five to ten minute report in class. A maximum of twenty points credit will be given for this work. The number of points of credit for satisfactory work is indicated after each reference.

1. Mitchell, G. E., Billions of Barrels of Oil Locked up in Rocks. *National Geographic,* Vol. 33:195-205 (10 points)
2. Bonsal, S., The Nation's Oil Reserves. *Rev. of Rev.,* Vol. 69:268-276 (5 points)
3. Smith, G. O., Where the World Gets Its Oil; But Where Will Our Children Get It? *National Geographic,* Vol. 37:181-202 (15 points)
4. Lee, Thomas, The Race for Oil in Venezuela. *World's Work,* Vol. 51:148-161 (10 points)
5. Shooting Oil Wells As a Fine Art. *Literary Digest,* Vol. 88, March 27, 1926: 21-22 (5 points)
6. Welliver, J. C., Oil: The New Industrial Giant. *Review of Reviews,* Vol. 74: 177-186.

VI. Examination

The examination will be in two parts corresponding to the "C" and "B" levels. You will write only on the part you have mastered. Your standing on the "A" level will be determined by the outlines handed in and reports given in class.

TEST ON PETROLEUM AND NATURAL GAS

"C" Level

True-False

Place a "T" before the statement, if it is true, and an "F" if false.

(..) 1. The average daily production of American oil wells is less than five barrels a day per well.
(..) 2. The first petroleum discovered in the United States was found in southern California.
(..) 3. In 1927 the United States produced nearly two-thirds of the world's total production of petroleum.
(..) 4. At the present rate of consumption the United States has enough petroleum to last many generations.
5. So important is petroleum that the great nations of the world are making strenuous efforts to get control of new fields.
(..) 6. Petroleum is generally found with natural gas.
(..) 7. It is easy to confine and store natural gas and thus prevent it being wasted.
(..) 8. Our exports of petroleum products are small.
(..) 9. The Appalachian Field has produced oil for over 75 years.
(..) 10. The productive oil fields that once existed between the Caspian Sea and the the Persian Gulf are exhausted.
(..) 11. The first important use of petroleum was for lighting.
(..) 12. Where easily available, natural gas is the cheapest and most convenient of all sources of power.
(..) 13. The problem of oil conservation is important.
(..) 14. The yearly value of natural gas produced in the United States is more than that of all the gold and silver produced annually in this country.
15. Large quantities of oil come from the region along the Gulf coast of Mexico.
(..) 16. Because of its heavy domestic consumption the United States imports large quantities of petroleum.
(..) 17. Petroleum has had little effect in spreading civilization over the world.
(..) 18. The largest production of petroleum in the United States is in the Ohio-Indiana field.
(..) 19. The chief oil fields of California are in the southern part of the Valley of California.
20. The United States produces more petroleum than all other countries combined.
(..) 21. The future of the petroleum industry is uncertain.
(..) 22. The only source of petroleum products is from oil wells.
(..) 23. Benzol is a product of petroleum.
(..) 24. The Diesel engine is an aid in the conservation of petroleum.
(..) 25. The United States exports but small quantities of refined petroleum products.
(..) 26. The petroleum of the United States is better for illuminating purposes than that of Russia.
(..) 27. Crude oil is not used for raising steam in boilers.
(..) 28. The United States is the chief producer of natural gas.

Recall

Write the answers to the following in the space between the questions.

29-35. Name the seven oil fields of the United States.
36-38. Give the three chief methods of transporting petroleum.
39-40. What two factors are responsible for America's prominence in oil production?
41-44. Give four large refining centers in the United States.
45-46. What are the two leading oil fields in the United States at present?
47-51. What are five important petroleum producing countries?
52-59. Each of the following is important in the petroleum industry. Locate and tell for what each is important.

	Location	Importance
Whiting		
Tampico		

Maracaibo
Tulsa
Note: No space is left between questions in the test as here printed.

Multiple Choice

Place the figure indicating the correct fact in the blank at the left.

60. ...... (1) Pennsylvania, (2) Illinois, (3) Oklahoma, (4) Kansas produces the most oil.
61. ...... Oil is extensively used as locomotive fuel in (1) Central, (2) Eastern, (3) Western United States.
62. ...... (1) California, (2) Oklahoma, (3) Texas, (4) Pennsylvania was the first producer of petroleum in the United States.
63. .... The largest percentage of petroleum is used for (1) kerosene, (2) fuel oil, (3) gasoline.
64. .... (1) Burma, (2) Port Arthur, (3) Baku, (4) Tampico is the center of the oil industry in the Caspian Sea district.
65. ...... Natural gas is used for (1) automobiles, (2) domestic fuel, (3) locomotives.

"B" Level

Do not write on this part of the test unless you have mastered the "B" LEVEL CONTRACT.

True-False

Place a "T" before the statement, if it is true, and an "F" if false.

(..) 1. Rock oil is synonymous with petroleum.
(..) 2. "Coal oil" was obtained from petroleum.
(..) 3. Chemically, petroleum is a simple substance.
(..) 4. A gusher has to be pumped.
(..) 5. Petroleum is found in sedimentary rocks.
(..) 6. Oil deposits can be determined by surface conditions.
(..) 7. Petroleum is generally found in anticlines.
(..) 8. Oil wells are drilled beneath the ocean along the coast of California.
(..) 9. The United States imports large quantities of petroleum from Mexico.
(..) 10. The Standard Oil Company rose to power thru the control of refining and transportation facilities.
(..) 11. Larger quantities of gasoline are obtained by the "cracking" process.
(..) 12. The geologist is of great assistance in locating oil reserves.

Recall

Write the answers in the space between the questions.

13. What is the probable origin of petroleum reserves?
14-18. Name five countries having large petroleum reserves.
19-20. What are the two chief types of crude petroleum, based upon chemical constituents?

SUMMARY AND CONCLUSION

The following summary will emphasize the aims of Contract work, methods of using it, and the advantages and disadvantages as they have been revealed in our experience with the method in geography classes at Whitewater. The statements given are to be regarded as tentative and in no sense final or conclusive. Further use and experimentation may make it possible to overcome several of the disadvantages listed. The experiment was carried on for

parts of two years in a school system where most of the work is not done by Contracts but in which numerous similiar experiments are being carried on in other departments. The results stated here are those that stand out after a brief experience in which everything possible was done to make the method a success.

I. Aims of teaching by Contract
   1. To enable the pupil to work when he desires to do it.
   2. To permit the pupil to work at his own pace.
   3. To give extra work for the bright pupil.
   4. To emphasize a unit of work instead of one day's assignment of certain pages in the textbook.
   5. To require mastery by all pupils of essentials as outlined in the "C" Level of the Contract.

II. Steps and Methods of using the Contract
   1. Preliminary discussion and motivation. Informal discussion to find what the pupil knew about the unit and to interest him in further study of it. This corresponds to the "Exploration" step in the "Morrison Plan."
   2. Supervised study. The time of the first day or days (depending upon the length of the Contract) was spent largely in working with the pupils and showing them how to study and where to find the information required.
   3. Study hour. In addition to supervised study during the recitation hour the pupils were expected to give a minimum of a fifty-minute class hour to individual study and preparation. Such preparation could be made in the study hall, library, or class room. This need not be one period each day, but may all be done at one session of several hours if the pupil prefers it.
   4. Discussion of class problems. The first part of each class period was given over to discussion of those points which had given difficulty to a majority of the pupils.
   5. Handing in written work. Certain parts of the Contract require written work. The pupils were informed when this was due and it was handed in at that time.
   6. Recitation. The last day prior to the examination, most of the recitation period was taken up with class discussions and drill work.

III. Values from the use of the Contract Method
1. All pupils master the minimum essentials.
2. Chance for "bluffing" is lessened.
3. Responsibility for learning is put up to the pupil where it belongs. The task is literally up to him.
4. It secures more careful preparation.
5. It gives opportunity for the pupil to work according to his ability, time, and interests. This is especially valuable for the bright and dull pupils.
6. It enables the pupil to work when he wants to rather than when the teacher wants him to work.
7. Some of the pupils said they learned more than by other methods. This was particularly true of the brighter pupils.

IV. Disadvantages in the use of the Contract method
1. Procrastination. Pupils are disposed to put off work from day to day until an amount of work impossible of mastery and assimilation accumulates near the end of the Contract period. This was not true of all but of some.
2. Lack of interest. The method deprives the teacher of the advantage of developing interest by full hour class discussions from day to day. Much of the text and other materials used for preparation is not written in an interesting style.
3. Lack of sufficient class discussion to emphasize important points and for drill.
4. Requires more time than some other methods
5. Lack of class unity because all are not doing the same work or are not doing it at the same time.
6. Large amount of the teacher's time necessary to work out the Contracts.

IRON AND STEEL: A HIGH SCHOOL UNIT IN WORLD GEOGRAPHY

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The following is the writer's "blueprint" plan. The explanations, questions and exercises appear in the sequence in which they actually occur in the teaching procedure. It was written concurrently as it was taught in the classroom at Waller High School, Chicago, during January, 1946, and is the elaboration of the same Iron and Steel unit as outlined by the same author in the February, 1945, JOURNAL.

PART I. INTRODUCTION

A. *The Importance of Iron and Steel in Our Lives*

Next to agriculture, manufacturing employs more people in the world than any other occupation, and of all manufacturing, the making of iron and steel is by far the most important. It is easy to see why this is true.

Most of the tools and machinery used to make other manufactured goods are made of iron or steel, so that iron and steel manufacturing is basic to all manufacturing. But for a very few examples of a primitive type, such as clay pottery fashioned with a stick or reed baskets woven by hand, it is difficult to think of any manufactured article which had not utilized some iron or steel implement in its making. The looms of the textile mills, the sewing machines of the garment shops, the buzz saws of the lumber mills, and the mixing equipment of the bakeries are but a few examples of hundreds of thousands of different kinds of steel machinery.

B. *Steel and Man's Progress*

The stages of advance in man are closely related to the invention and development of the iron and steel industry, for even the wheel which changed man's method of work more than any other early invention did not reach its heights of usefulness until made of steel.

C. *Steel and Our Modern Life*

We could not lead the kind of lives we do in a modern industrial nation were it not for iron and steel. Steel is used for:

1. Modern construction, buildings, bridges, tunnels, etc.
2. Modern transportation, locomotives, automobiles, boats, planes, etc.

3. Modern communications
4. Electrical power produced by generators to move the wheels of industry
5. Sanitary, plumbing, heating equipment
6. Surgical instruments to save lives
7. Modern implements of warfare to safeguard our interests

D. *Steel, the "barometer" of business*

Because of its vital function, sales of steel have come to be an indication of the tempo of production and sales in other commodities and of the general prosperity of the country as a whole.

PART II. MAKING IRON AND STEEL

A. *Iron and Steel Terms—Their Meanings*

Look up in advance, the meanings of the following terms in order that you may better understand subsequent discussions. After class discussion you should have something like the following in your notebooks.

1. Iron ore is a reddish rock just as it is found in nature. The iron in the rock is in combination. It cannot be picked out but must be melted out.
2. Coke is coal which has been heated to a tremendous temperature so as to drive off the impurities. Almost pure carbon remains which burns with a much hotter flame than coal.
3. Pig iron is the pure molten iron, unrefined and unprocessed as it pours out of the heated rock into small brick-like molds called "pigs."
4. Coke by-products are made from the gases which are piped off. Some of the gas is burned in your kitchen gas stoves. The remainder is made into a surprising array of products which show what modern chemistry can do. Dyes, perfumes, medicines, tars and the marvelous nylon thread all come from coal gas. In Chicago, the gas bills are printed: Peoples Gas Light and Coke Company. Do you now see why?
5. Steel is pig iron remelted in a tremendous cauldron combined with other ingredients and reheated in great furnaces. Special chemicals are added to produce special kinds of steels. Some steels are made elastic so as to be pulled into wires, some so as to take a high polish like stainless steel or a sharp edge like razor steel.

B. *Charging the Black Furnaces*

In the booklet,[1] *The Story of Steel,* we can get a good idea of steel making. As we follow the processes thru the pictures, it is almost as good as a real visit.

PART III. BRINGING THE RAW MATERIALS INTO GARY

A. *The Iron Ore*

1. At Hibbing. Look at the map which shows iron ore fields. One of the greatest

[1] *The Picture Story of Steel* (New York: American Iron and Steel Institute, 1937), pp. 2-41.

iron ore deposits found near Hibbing, Minnesota, is called the Mesabi. From the scale of miles you can estimate its length and width.[2] One mine which is now being operated is 2½ miles long, 1 mile wide and 350 feet deep. Imagine such an area near your school. What streets would form its boundaries? How many times the height of the school building would be its depth? This huge colored postal card from Hibbing shows the natural reddish color of the ore and the railway tracks which have been moved down eight times as the ore was removed at higher levels. Iron ore from this huge open pit is simply blasted with dynamite, lifted with steam shovels on to open cars.

2. At Duluth. The long trains of cars are pulled to the nearest lake port which has the appropriate loading equipment. From our picture collection and those in the books, you can see the marvelous equipment which makes it possible to load a great ore boat holding 10,000 tons in less than one hour.[3] Name three other lake ports from which ore is shipped.
3. Trip thru the Great Lakes. Ore boats follow the same route thru the Great Lakes as the wheat boats. They are shaped similarly too, long and narrow so as to sail thru the locks at Soo. After passing thru the Straits of Mackinac and Lake Michigan they glide into the steel mill yards at Gary.
4. Layout of the Steel Mills.[4] In this airview picture and corresponding diagram of the Steel Mills you can see how a "slip" has been cut into the yards from the lake in order to allow the ore boat to steam into the yards. Do you see the great unloading cranes? The great piles of ore, and the blast furnaces are near the slip. Can you see why? Steel mills use a lot of ground space. One story buildings which house rolling mills, coke ovens, sheet mills, bridge factories and stretches of railway tracks which carry heavy materials from one process to another shows that an efficient layout utilizes many acres.

B. *The Coal*

1. Coal Producing Areas

   We have seen where and how the iron ore is brought in, now let us see where the coal which is made into coke in the great coke ovens near the steel mills comes from.

   Look at the map which shows coal producing areas and amounts produced in the United States. These are some coal facts which we can read from the map.

   a. The one most important producing region appears to be in the great Appalachian chain and stretches from northern Pennsylvania to central Alabama.

   b. Smaller amounts are mined in Illinois and Indiana.

   c. Still smaller amounts are widely distributed thruout the great Rocky Mountain area.

2. Coal for Gary

   From which of these sources is coal obtained for the Gary mills? You might make a tentative guess that coal for Gary comes from the Illinois field and the guess would be intelligent, because it is the closest source, but when you check by reading you find that Illinois coal does not coke satisfactorily, so that a rail haul of about 500 miles is necessary to bring in coking coal from the closest Appalachian field.

[2] *Ibid.*, p. 2.

[3] Charles Colby and Alice Foster, *Economic Geography* (New York: Ginn and Co., 1944), p. 314.

[4] *Ibid.*, pp. 316-317.

3. Formation of Coal
   At this point it might be well to take a little time to find out more about coal, how it was formed, how the earth's crust buckled in places and exposed seams on the hillsides and how shafts must be sunk to reach seams in level places.
4. Grades of Coal
   The quality of coal depends upon the length of time involved in its formation and the pressure to which it was subjected. There are many grades from the anthracite of Pennsylvania to the crumbly earthy peat of Ireland.
   Did you realize that a sparkling diamond contains the same element as a piece of sooty coal? Why do some diamonds have a yellowish cast? Where are black diamonds found? How used?
5. Important Uses of Coal Other Than Coke
   a. For generating electricity
   b. For generating other steam power
   c. For heating homes and buildings
   d. For making important by-products such as gas, chemicals, nylon, tars, dyes and perfumes

PART IV. IRON AND STEEL DISTRICTS IN THE UNITED STATES

A. *Characteristics of an Iron and Steel District*

All iron and steel industrial districts are similar and readily recognized. There is very little difference in the landscape in the Gary, Pittsburgh or the Ruhr district in Germany. All are busy, crowded, smoky places. Besides the glowing furnaces, there are foundries and mills of all kinds which make articles of steel. Automobile plants, harvester works, machine shops, construction companies and miles and miles of railroad tracks make up the scene. It is a densely populated place with the closely spaced towns and cities of the workers.

B. *Principles of Location*

If a steel corporation were to build a new plant in the United States, the promoters would look for a place that possessed certain advantages so that they could do a big business and compete successfully. Such a plant would be located:

1. Where iron ore could be brought in cheaply by water.
2. Where coal need not travel too far. It is uneconomical to transport coal long distances for great amounts are needed not only in the smelters, but in the nearby factories and power plants.
3. Where there is a big nearby market for steel such as found in densely settled areas where there are many cities, factories, trains, etc.
4. Where there is an abundant labor supply such as found in urban areas.
5. Where there is a suitable site for the plant layout.
6. Where there is an abundant supply of water which is needed in the processes.

In view of the above principles, would Duluth, Minnesota be a good

place for a big iron and steel industry? Would Price, Utah?

C. *Major Iron and Steel Districts*

As we have seen, iron and steel districts are located according to reason. Let us now see where they are and from maps and readings learn some facts about each. One convenient way of putting your findings together is to fill in a table like the following:

	Chicago	Pittsburgh	Lake Erie	Eastern	Birmingham
Location					
Important Cities					
Sources of Coal					
Sources of Iron Ore					
Special Markets					
Special Advantages					
Special Disadvantages					

PART V. MAP SUMMARY

A. *Map*

An excellent way to summarize is to make a map. One can record a great deal in this convenient short hand way. A legend will make it possible for others to read the map story of steel, but you will be reminded of many additional facts and ideas which you learned in this unit. On an outline map of Eastern United States mark:

1. The iron ore deposits with deep black
2. The Appalachian coal areas with light gray
3. The five iron and steel districts with red stripes
4. The major cities with strong dots
5. The iron ore lake routes with a green line
6. The major coal routes with dotted green lines
7. Give your map an appropriate title

PART VI. TEST

I. Iron and steel manufacturing is basic to all other manufacturing. Show why this is true

II. Which *two* should you select as being most critical to modern industry?

1. Coal for coke
2. Coal for coke by-products
3. Coal for power (steam and electric)
4. Coal for heat

III. Check the *two* reasons which *best* help to explain why September is the busiest month at the Soo Canals.

1. Ore is bought in anticipation of winter needs.
2. A rush to send thru ore supplies before the lakes freeze.
3. Wheat harvest comes thru at this time, too.
4. Output of ore mines is greater in the Fall.

IV. Five desirable considerations in locating an iron and steel district are:

1. A Great Lakes position for cheap access to Superior iron ore
2. Not more than a 150 mile rail haul for coal
3. A market in nearby cities crowded with industries
4. An abundant labor supply
5. A suitable site

Which of the above conditions (use numbers) are lacking conspicuously in each of the following districts? There may be more than one.

Pittsburgh ______________ Chicago ______________

Eastern ______________ Birmingham ______________

V. Write P if true of the Pittsburgh District.
B if true of the Birmingham District.
E if true of the Eastern District.
L if true of the Lake Erie District.
C if true of the Chicago District.
N if true of none.

You may use more than one letter if needed.

________ 1. Ore boats can unload directly in the steel mill yards.
________ 2. About a 500 mile rail haul needed for coal.
________ 3. About a 100 mile rail haul needed for coal.
________ 4. Farthest from its source of iron ore.
________ 5. Market limited.
________ 6. Cheap labor supply.
________ 7. Early start, a great advantage.
________ 8. Old equipment, a handicap.

__________ 9. Coal right at hand.
__________ 10. Iron ore right at hand.
__________ 11. The Piedmont cotton mills an important market.
__________ 12. The southern railways an important market.
__________ 13. The automobile industry an important market.
__________ 14. The Deering Harvester Works an important market.
__________ 15. The Pullman Company an important market.
__________ 16. The export trade important.

THE MINERAL INDUSTRIES: A UNIT IN HIGH SCHOOL GEOGRAPHY

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The unit in commercial geography here presented is intended to show how a high school instructor may organize and teach the importance, distribution, and conduct of the mineral industries in the United States. Such a unit naturally would not be the first in the course, and for that reason the students will have had some training in geographic thinking. Probable answers students will make are included only where it seems necessary in order to clarify the line of thought and organization. The unit is written as the teacher would present the work.

THE IMPORTANCE OF THE MINERAL INDUSTRIES

The following are descriptions of two communities in the United States out of which our next group of problems will grow. In reading about these places remember that they are typical of many areas in which minerals play a large part in the lives of the people, but that conditions in the two regions are not true of all places where minerals are found. I will not tell you where the cities are but want you, as our study progresses, to see if you can name either place or determine its locality.

(1) In 1859, at a place in the United States almost entirely devoid of human habitation a great gold and silver lode was discovered. On three sides of the site a desert stretched unbroken for hundreds of miles. Mountains broke the desert off abruptly on the west forming a barrier with high passes blocked by snow thru the winter months. The discovery was made known in July, and tho "the site lacked timber, food plants, and even water," by October people were flocking to the place and a town was taking shape. Huts and tents became the quickly constructed homes of the rapidly increasing population of miners. In March, 1860 "after a tedious and difficult trek over the moun-

NOTE: The writer wishes to acknowledge indebtedness to Miss Edith P. Parker, Department of Geography, University of Chicago, under whose direction this paper was written.

tains" the first pack train reached the community bringing provisions and equipment, which brought fabulous prices. It took from six to ten days for wagons to make the trip to the camp, and yet only half a year after this first pack train arrived about 450 wagons were carrying supplies back and forth across the mountains. "The camp was fast becoming a town; tents were replaced by board cabins, and there were a surprising number of business houses and offices, including 38 stores of general merchandise, 25 saloons, 9 restaurants, 8 boarding houses, 10 livery stables, and some 70 others. In one lodging house a man had to pay $1 a night for a wooden bunk with hay tick, in a room 20 feet by 12, which he shared with 17 others. The population at the close of the year is estimated to have been 2,844."

The next year the settlement obtained municipal government and became a chartered city. Streets were laid out, substantial business houses were built and sidewalks were constructed. Within six years after its founding the population of the city had reached about 11,000. Schools and churches grew and newspapers began to enter circulation.

By 1870 a considerable mining district had grown up composed of the central town and a number of outlying settlements. Before long disaster threatened the mines when ground water began to pour into the shafts, but the costly construction of a drainage tunnel removed this danger and the community was given renewed life. Water for the town was obtained by tapping a lake high in the mountains at a distance of about thirty miles. Just before 1880 the combined population of the towns in the district was estimated at 20,000, the original settlement boasting over half of the people. This period marked the peak of prosperity here in a desert environment. After 1880 the product from the mines began to decrease in value and the cost of operation increased as the mine shafts had to be sunk deeper and deeper. As a result the central boom town of the seventies shrunk into insignificance almost as rapidly as it had gained fame: in 1890 its population was 8,500; in 1900 it was 2,700; in 1910, 2,250; and in 1920, only 1,200.

(2) In 1764 a town was laid out where two streams meet to form one of the greatest rivers of the nation. Its location at the head of this waterway early made the settlement an important focus for trade and travel. It was not long until iron ore and coal were found in great abundance in the vicinity. These were the chief factors in the town's century and a half of growth in which it became the greatest iron and steel center in the United States. Not only were transportation facilities, raw materials, and power resources available, but the district became the center of a populous area which served to furnish an abundant supply of labor for iron and steel mills and a ready market for the product of these mills.

In 1858, the district had gained fourth rank among the iron producing regions of the world and the population had reached 49,000. In the next two decades the population jumped to 156,000. The place became the leading center of production in the United States when abundant and cheap coking coal of excellent quality was found nearby. Coal was so plentiful and conditions were so favorable for the continued manufacture of iron and steel here that, as the early deposits were exhausted, iron ore came to be imported from distances of more than a thousand miles.

The frontier settlement of 1764, with but one blacksmith shop, has now become a thriving industrial center of more than half a million people. Its steady growth has covered a period of 170 years and thruout most of that time its fame has rested chiefly on the fact that rich minerals occur within its surrounding area. Along with the development of iron and steel as the outstanding industries many other lines of activity sprang up and have flourished, such as the manufacture of foods, glass, tin plate, firebrick, electrical machinery, and railroad cars.

What contrast did you note in the type of development which each of these two places has enjoyed? (One was a boom town, now

declined; the other has had a steady and large growth.) Were there differences in the number and types of activities that arose side by side with mining? In which place did the minerals most affect the growth of large industries? What were these minerals? And what were the minerals which affected the other place? Since such conditions are often typical of places in which these minerals occur, then do you think one would be justified in concluding that altho the lure of the precious metals is tremendous, the more lasting effects of coal and iron give these minerals more importance in people's lives? Remember your opinion and watch for ways to support it as our study proceeds.

We have seen that two places in the United States gained importance chiefly thru the existence of minerals nearby, but that the development of the two cities differed greatly, partly because of the difference in the kinds of minerals found. Reread the descriptions to discover what other factors related to minerals probably contributed to this difference of development. (The location of the mineral; its value and uses; the richness, depth and size of the deposit) Then as we study the mineral industries to find to what extent men have made use of them we will have to keep in mind four important things: (1) The kind of mineral, (2) Its location or distribution, (3) Its value and uses, and (4) The character (richness, depth, and size) of the deposit.

Since it will not be possible or practical for us to study all the minerals, we will consider only those which are the most common and of the greatest value to man. What source or sources can we consult to find out quickly what the most valuable minerals are? By using the Statesman's Yearbook make a rough bar graf of the most important minerals. You will find that the table in the Yearbook divides them into metallic and non-metallic—terms which we will not stop to define just now. When you record the figures from which the graf will be made, use only numbers above 19 million dollars in the metallic group and above 300 million dollars in the non-metalic group. Since the figures vary so in size, ranging from 19 to over 300 million dollars, what will you have to do to get all on the same graf? (Reduce them proportionately and round out the numbers.) The graf will be made as a part of the study outside of class. What did you find to be the eleven most important minerals? (Petroleum, bituminous and anthracite coal, iron, natural gas, copper, lead, aluminum, gold, zinc, and silver)

THE DISTRIBUTION OF THE MINERALS

Before we undertake to study our graf—to compare and contrast the values of the minerals—what will you want to know besides the number and kinds? (Their location or distribution) In Goode's School Atlas, p. 60, you will find a combination map and graf showing the value of mineral output in the different states in 1928. With the use of this map list under each mineral the states in which it is found. List states in the approximate order of their importance. There will be a few of the minerals which we have found to be of value that are not shown here. Where can you find out the states in which these others are located?

(Lists such as the following should result:

Coal	*Petroleum and Natural Gas*	*Iron*	*Gold and Silver*
Pennsylvania	Oklahoma	Minnesota	California
West Virginia	Texas	Michigan	Utah
Ohio	California	Alabama	Montana
Illinois	Pennsylvania		South Dakota
Kentucky	Illinois		Colorado
Indiana	Arkansas		
Oklahoma	Louisiana		
Alabama	Kansas		
Virginia	West Virginia		
Wyoming	Ohio		
Kansas	Illinois		
	Kentucky		
	Wyoming		

Copper	*Lead*	*Zinc*	*Aluminum Ore*
Arizona	Missouri	Tri-state district	Arkansas
Nevada	Idaho	Missouri	Georgia
Utah	Utah	Kansas	Alabama
Montana		Oklahoma	Tennessee)
Michigan		New Jersey	
New Mexico			

What conclusion can you make as to the general location of silver and gold deposits? Where, in general, is most of the coal located? Recall the two descriptions of the mining centers which you read at the first of our study. Can you now make a justifiable guess as to the part of the country in which each is located? (The first, the boom city, is probably in the west or Rocky Mountains and the second city is probably near the Ohio Valley. Some of the students may here recall that the second was located at the confluence of two streams which form an important river. Knowing that the Ohio is important, after they look to see whether it is formed

in this way, they may decide that Pittsburgh is the location of the second example. If they do, then caution them to continue to be on the lookout for things which will verify their decision.) You remember that in the second city iron came to be imported from a distance of 1,000 miles after the local ores declined. If this place is somewhere near the Ohio, then from what states could this iron ore have come? (Minnesota, Michigan, or Alabama) Notice that, of the three states producing the largest amount of iron ore, Alabama is the only one which produces a great quantity of coal also. Since coal is used extensively for power in the manufacture of iron and steel, will you expect Alabama to keep most of its ore for local use? Then from what places will the Ohio valley coal states probably receive most of their ore? (Minnesota and Michigan) What other minerals besides coal are great sources of power? (Petroleum and natural gas) In what two localities did you find most of these being produced? (Texas-Oklahoma and California) Will you expect most of these minerals to be used where they occur or to be transported elsewhere? Consult the map of manufacturing states in Goode's Atlas, p. 61. Since petroleum and natural gas are sources of power, do you think they will be used in states where power is needed for manufacturing? Then to what part of the country will these minerals, especially those from Texas and Oklahoma, probably be taken? Remember that each opinion offered will have to be substantiated or verified later thru some source such as your text.

THE COMPARATIVE VALUES OF THE MINERALS

Compare the map of mineral production with Goode's map showing the distribution of population. What generalization and conclusion can you make as to the distribution of minerals and the places where most of the people live and work? (In general, the greatest area of mineral production corresponds with areas of large population, leading one to conclude that there is a close relationship between the production of minerals and the numbers and distribution of peoples.) What contrast do you note between the numbers of people and the amount of manufacturing in the places where silver and gold are located and those where coal and iron are found? (Small population in gold and silver states; large population in iron states) Since you were told that the two examples you read were typical, had you expected this to be true? Why? It seems, then, that in so far as they directly affect man and his activities, iron and coal are of much greater value in the United States than are the

precious metals, silver and gold.

Thus far we have learned what the chief minerals are, where they are found, and what their importance is in man's work. Before we study each mineral in turn to find out why it is so important, let us consider more closely the comparative values of the different minerals themselves. By studying the graf you have constructed, make at least three statements which will characterize the relative values of the minerals. (Such statements as these should result: Petroleum exceeds in value any of the other minerals. From the standpoint of the value in dollars, silver and gold are among the least important of the eleven minerals. Coal and iron are almost as valuable as all the others combined. Those which furnish power exceed all others.)

THE CONDUCT OF THE MINERAL INDUSTRIES

Had you expected to find such a great difference in the money value of silver and gold as compared with the other minerals? Since you thought that the precious metals would rank higher than they do, it is possible that things other than money value might help to determine their importance. What other factors could be of influence? (The scarcity of the precious metals, their character, their use, etc.) Read carefully in your text to find out how such things as these affect the uses of gold and silver. Use the following questions to guide you in your thinking.[1]

1. Thru what stages has the mining of gold usually passed before it is exhausted? How have men's needs and abilities helped to bring about these different stages in mining?
2. How have the places of occurrence and the ways of mining helped to affect the initial settlement and the permanence of production in some localities? Give examples of places which have shown notable rises and declines in production. (Call student's attention to the first description read, which might be used as an example.)
3. How have improvements in mining and the discovery of new deposits helped to make it difficult for people who receive fixed incomes? What qualities does gold have which make it useful for money?
4. Does silver have much the same uses as gold? Why?
5. How have the appearance, scarcity, and durability of the two helped to over-emphasize the value of the precious metals?
6. Why does the prosperity of silver depend largely upon the prosperity of gold, copper, or lead?

On finding that silver, gold, and copper deposits were located generally in the same states one would expect to find also a close

[1] These and the following questions are based on the study of the various minerals as commonly presented in a high school text. The teacher will find it easy to adapt them to whatever text is in use.

agreement in their occurrence. As you read in the text, use these questions to find out how copper production differs from gold and silver in spite of the fact that it is often found near them.

1. How does the occurrence and production of copper at Butte, Montana, differ from that in the upper peninsula of Michigan? Why might Butte be a good place to start an industry requiring sulphuric acid? Despite the pureness of the mineral in Michigan, why is production of copper there now declining?
2. Why is copper increasing so in importance?
3. How has this increase in importance affected the amount of extraction now being undertaken with low-grade ores?
4. For what reasons has the United States, with its great sources of copper, become a greater smelter of foreign ores than Great Britain?

You have learned that gold and silver often occur with copper, tho not always, and that they differ from copper in the uses man makes of them. Two other minerals which are often associated with copper are lead and zinc, for lead is sometimes found with copper ores, and zinc is combined with copper in making brass. However, lead and zinc have qualities which give them distinction in themselves and make them important as minerals. In what part of the country was it that you found these minerals being produced? Since your text fails to give a discussion of lead and zinc, to what sources can you go to find out the other things we want to know about them; that is, the character and size of the deposits, and the value and use of lead and zinc in man's work?

Like copper, aluminum is also increasing in importance because of the many new uses which modern inventions are finding for it. Read in the text, and from the discussion of aluminum as it is given there explain the following statement:

> Aluminum ore, or bauxite, is one of the commonest elements of the earth's crust, and yet its manufacture is as costly as almost any other mineral; chiefly for this reason one of our greatest aluminum plants is located at Niagara Falls.

What advantages has aluminum over iron? (Lighter, tougher, less corrosive) Yet on the graf which you made you found that iron far exceeds aluminum in value. Using these questions as a guide, study the text to find out why iron holds such an important place in our activities.

1. Think of all the things you have done today and of all the materials you have used. In what ways have you made use of things in which iron played a part either directly or indirectly? You are students in a town of 18,000. Do you think people in other kinds of work in other places would have even greater need for iron and steel products than you? Why? Where?
2. Where are our largest centers of population? Where did you find most of the iron ore being mined? Why have the largest iron and steel manufacturing cities grown up

along the upper Ohio River rather than at the places where most of the iron is produced?

3. What advantages did Pittsburgh have which made it become the greatest iron and steel center in the nation? If a company were going to construct a new steel plant, in what respects would Gary, Indiana, be a better site than Pittsburgh?
4. What advantages has Birmingham, Alabama, over both Pittsburgh and the lake shore cities for the production of iron and steel?
5. Can you give sound reasons why Colorado, with both iron and coal, produces only 1 per cent of the country's iron and steel?
6. How have inventions in the last century helped to concentrate iron making, which in former times was scattered?
7. Why is the United States, the largest iron producer in the world, a great importer of ore?

What other great mineral plays a very important part in the production of iron and steel? In what ways? Since coal is a source of power, will you expect it to be used in other industries also? Give examples. Then will you expect to find a close relationship between coal, population, and manufacturing just as you found a relationship between iron, population, and manufacturing? Read about coal and tell why the following statements are true.

1. If the production of coal were suddenly to cease, the United States would probably be thrown into a panic.
2. The production of coal in the Appalachian Mountains was in large part responsible for the very rapid settlement of the states along the Mississippi River.
3. Pittsburgh early became the greatest city for the collection and distribution of coal.
4. Altho the heart of the Appalachian coal field is in part of West Virginia and in eastern Kentucky and Tennessee, the mines there were slow to develop.
5. Northern Alabama has no better coal than West Virginia and is farther from the country's greatest manufacturing cities, yet its coal mines were developed much more rapidly than those in West Virginia.
6. Missouri has much larger deposits of coal than does eastern Pennsylvania, yet the output in Missouri does not compare with that of eastern Pennsylvania.
7. Much of the transportation of coal is becoming less and less necessary.
8. The methods and expense of mining coal vary greatly even in adjacent fields.
9. *Ammonia, tar, chemicals, and dyes are produced in and near Connellsville, Pennsylvania.*
10. Other things being equal, if a flour milling company had the choice of setting up a long time project where it could secure either coal or water power, it would probably choose the site where water power was available.

Despite the fact that our coal resources are limited and must be conserved, petroleum and natural gas, two great rivals of coal, are even more subject to waste. Read in text, using these questions to help you determine the chief factors in the rôle which petroleum and natural gas play in our world of commerce and industry.

1. Contrast the trend in the production of coal in the United States with that of petroleum. Give reasons for these contrasts.

2. With which example of city development in our first two descriptions do you think an oil town might best be compared? Why?
3. How has the discovery of oil in the Pacific coast states been especially important to that section?
4. Trace the changes and development in the use of petroleum. Why does the young chemical engineer consider the oil industry one of the richest fields open to him?
5. What are the advantages of natural gas over coal for fuel? How are these advantages often offset by the character and occurrence of the gas?
6. Explain as fully as you can why the largest refinery for the Sinclair Oil Company, whose oil fields are mostly in Oklahoma and Texas, is located in East Chicago, Indiana.
7. Give reasons why crude oil is shipped to European refineries rather than first refined and then shipped to Europe. On the other hand, why is the refined product shipped to such countries as New Zealand, Greenland, and East Africa?

Thru the use of maps of the distribution of minerals, manufacturing and population; the grafs you yourselves made comparing the value of minerals; and the discussions your text gave you concerning the conduct and importance of the mineral industries, you have seen how and why the activities of the people in this country are so closely concerned with minerals here. You have seen also that because of many different factors, both natural and those relating to man, some mining communities differ greatly in industrial development and in population from others. By using the two descriptions from which you first discovered what things are important to look for in a study of minerals, write a short paper comparing or contrasting the geographic relationships which you found in the two places. *Remember,* your task will be difficult and perhaps fruitless unless you are certain that you understand just what geographic relationship means as we have so often explained it. Locate these two cities as nearly as you can and tell why you chose these locations.

Sources for the two descriptions.

1. Jones and Whittlesey: An Introduction to Economic Geography. Description of Virginia City, Nevada.
2. Harriet Carter: Geography of the Iron and Steel Industry of Pittsburgh. Master's Thesis, University of Chicago, 1921.
3. Encyclopedia Britannica, Article on Pittsburgh.

THE BULK FREIGHT TRADE OF THE GREAT LAKES

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This unit was prepared for classes in Senior High School geography. It is based upon materials derived from the "Marine News" column published daily in the *Cleveland Plain Dealer,* and upon information gained from sound and silent motion picture films, lantern slides, mounted pictures, maps, charts and tables.

The daily newspaper records of arrivals and clearances at lake ports, the records of commodities loaded and unloaded, and of passages up and down the Great Lake waterway furnish materials for study and interpretation.

The motion pictures offer first hand contact with ships, cargoes and port activities. They furnish experiences which put life and meaning into the more prosaic records. They provide field experiences within the confines of the classroom and are a substitute for reality.

The lantern slides and mounted pictures offer opportunity for closer study of ships and cargoes. They are as effective in their way as are the films. Their use permits greater student activity and a more thoro investigation of details.

This unit is based upon data for the year 1941. Later data have not been published, since all information concerning ships and commodity movements was withheld following the outbreak of World War II. When publication is again resumed new materials will be available and should be used.

The preliminary organization of a unit such as this requires time, as the daily "Marine News" reports must be collected for at least a month, to provide a class of thirty with working material. Each report must be mounted separately so as to be available for individual use. Reports for a season should be assembled for general reference.

Fig. 1. Part of the outer harbor of Cleveland and the entrance to the inner harbor.
(Courtesy of Butler Photo.)

THE BULK FREIGHT TRADE OF THE GREAT LAKES

I. What is the Great Lakes waterway and what are some of its important ports?

A. On an outline map indicate by name the following:

1. Lake Superior	9. Strait of Mackinac
2. Lake Michigan	10. St. Clair River
3. Lake Huron	11. Lake St. Clair
4. Georgian Bay	12. Detroit River
5. Lake Erie	13. Welland Canal
6. Lake Ontario	14. St. Lawrence River
7. St. Mary's River	15. The Illinois Waterway
8. Sault Ste. Marie	16. New York State Barge Canal

B. From a copy of "Marine News" secure the names of

1. 9 ports on Lake Erie
2. 6 ports on Lake Michigan
3. 5 ports on Lake Superior
4. 4 ports listed in the record of "Steamer Passages"

C. Locate these ports. Place a dot for each in its proper place on the outline map. Write the name of the port beside the dot.

II. What commodities are shipped over the Great Lakes waterway?

A. From a copy of "Marine News" for a single day secure data concerning the number of ships that enter and leave each port; data concerning cargoes these ships carry. This information is listed under headings: "Arrived" and "Cleared." At some ports a great many different kinds of cargoes are handled, at others, very few. List each kind. Count carefully the number of ships carrying each commodity. Record these numbers. Ships without cargo are listed as light. Keep a record of number light.

B. Have your data ready for tabulation on the blackboard. Your data added to those of others in the class will make a month's record of shipping on the Great Lakes.

C. From the tabulated data secure answers for the following questions:

1. What commodities are the important ones in lake shipping?
2. Are these commodities raw materials or manufactured goods?
3. Are these commodities heavy or light?
4. Are they bulky or do they require little space?
5. How do you account for the large number of ships that arrive light at the ports of Ashtabula, Sandusky and Toledo?
6. How do you account for the large number of ships that arrive light at Duluth?
7. How do you account for the large number of ships that leave Gary, South Chicago and Indiana Harbor light? Where do they go?
8. Make a general statement concerning commodity movements at Lake Superior ports.
9. A general statement for Lake Erie ports.
10. A general statement for Lake Michigan ports.

D. From the tabulated data ports may be classified. Indicate those that are:

1. Iron ore shipping ports
   Iron ore receiving ports

2. Wheat shipping ports
   Wheat receiving ports
3. Coal shipping ports
   Coal receiving ports
4. Petroleum shipping ports
   Petroleum receiving ports
5. Sulphur shipping ports
   Sulphur receiving ports
6. Merchandise shipping ports
   Merchandise receiving ports
7. Newsprint shipping ports
   Newsprint receiving ports
8. Pulpwood shipping ports
   Pulpwood receiving ports
9. Auto shipping ports
   Auto receiving ports

N.B. If new ports appear in this list indicate them on your outline map.

III. Why are heavy raw materials the chief products carried on the Great Lakes and why are certain of these products handled by some ports and not others?

A. Why ports specialize in different commodities.

(Consult maps in textbooks showing distribution of wheat and corn; iron ore, coal, petroleum, forests; railroads, pipelines; population.)

1. How are areas of production situated in relation to the Great Lakes?
2. Are products such as iron ore and coal localized so they are tributary to some lakes and not others?
3. How do the maps help explain the heavy movement of:
   a. Coal from Lake Erie ports?
   b. Coal to Lake Superior ports?
   c. Iron ore down the lakes?
   d. Newsprint and pulpwood from Lake Superior ports?
   e. Petroleum from Lake Michigan and Lake Erie ports?
4. How does location of corn and wheat producing areas help explain grain movements from Lake Superior and Lake Michigan ports?
5. How are rail and pipe lines related to producing areas and to ports on the Great Lakes?
6. What does the population map suggest as some of the reasons why commodity movements are heavier from west to east than from east to west?

B. Why a water route is better for heavy raw materials.

(Consult "Annual Report Lake Carriers' Association 1941" and Table X, p. 46, "Analyses Lake Superior Iron Ores, Season 1943," by Lake Superior Iron Ore Association, Cleveland.)

1. How much does it cost per ton to ship iron ore from
   a. Head of Lake Superior to Lake Erie ports?
   b. Marquette to Lake Erie ports?
   c. Escanaba to Lake Erie ports?
   d. Escanaba to the Chicago District?
2. How much does it cost per ton to ship iron ore by rail from
   a. Mines to Lake Superior shipping points?

b. Lake Erie ports to Canton and Massilon, Ohio?
c. Lake Erie ports to Pittsburgh?

3. How much does it cost per ton to ship coal from
   a. Lake Erie ports to head of Lake Superior?
   b. Lake Erie to Milwaukee and the Chicago District?
   c. Lake Erie to Georgian Bay?
4. How much does it cost per bushel to ship wheat from
   a. Ft. William to Buffalo?
   b. Ft. William to Georgian Bay?
   c. Ft. William to Montreal?

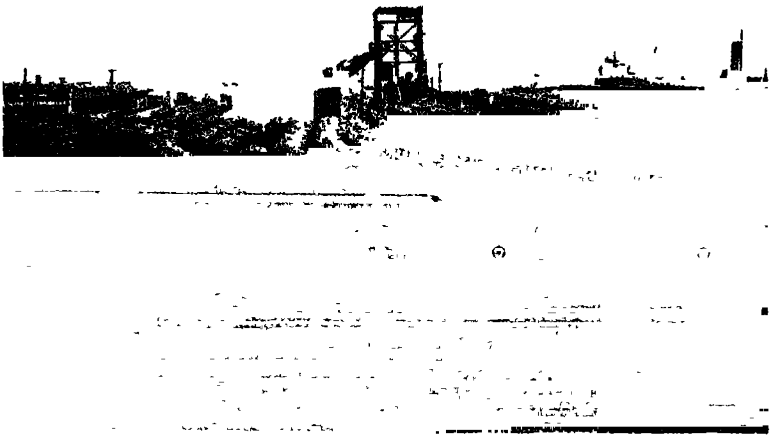

Fig. 2. Coal docks on the lake front

5. How much would it cost to ship a bushel of wheat by rail?
6. What is the average distance lake cargoes are carried? (Consult "Marine News," October 20-21, 1941)
7. What is the average freight charge per ton mile on the lakes? (Consult "Marine News," October 20-21, 1941)
8. What are the advantages of the Great Lakes as a highway in terms of transportation costs?

IV. What types of ships carry the heavy raw materials over the Great Lakes waterway?

A. 16 mm. films, lantern slides and mounted pictures furnish information concerning ships and shipping on the Great Lakes. The following are to be used:

1. Sound films
   a. "Great Lakes." National Film Board of Canada. 2 reels, technicolor.
   b. "Lake Carrier." Office of War Information. Bureau of Motion Pictures, Washington.

c. "Port of Cleveland." Ernest M. Reynolds. Gold Seal Super-Scenic.

2. Silent films
   a. "Boats on the Great Lakes." Educational Film Service. Battle Creek, Michigan.
   b. "Transportation on the Great Lakes." Eastman Classroom Films.
3. Lantern Slides (Cleveland Dept. of Visual Aids)
   a. "Cleveland Harbor"
   b. "Great Lakes Shipping"
   c. "Development of Great Lakes Transportation"
4. Mounted pictures—Cleveland Harbor Activities
   (Enlargements 12 x 14)
   a. *SS Carl D. Bradley* unloading limestone at mouth of Cuyahoga River
   b. *SS Powell Stackhouse* unloading iron ore in outer harbor
   c. *SS A. B. Macbeth* unloading wheat at Montana Flour Mill
   d. *SS S. T. Crapo* with cement at Huron Portland Cement Co.
   e. *SS Fayette Brown* with iron ore
   f. *SS Grand Island* on way up Cuyahoga River with iron ore
   g. *SS Kelley Island* unloading sand at dock on the Cuyahoga
   h. *SS Sir William Fairbairn* unloading flax seed at Sherwin Williams Paint Company
   i. *SS Regent* and *SS Paratex* with gasoline at Gulf Refining Co.
   j. Coal docks on lake front, Cleveland

   N.B. Information concerning the size of these ships and their cargoes may be secured from mimeographed sheets based upon this set of pictures. Consult this material.

B. From the pictorial materials secure answers to the following:
   1. What are the outstanding features of lake freighters?
   2. Why are they well named the "long ships"?
   3. How do they lend themselves to speedy loading and unloading?
   4. What are the advantages in having lake freighters flat bottomed?
   5. What are the advantages in having a long, unobstructed deck?
   6. What special loading and unloading equipment speeds the handling of such cargoes as iron ore, coal, wheat and oil?
   7. What is the capacity of some of the freighters?
   8. What kinds of ships carry petroleum products on the Great Lakes?
   9. What kinds carry sand, limestone and cement?
   10. What are car ferries? Where are they used? Why?
   11. List at least 10 raw materials featured in the films and pictures.
   12. List at least 5 types of ships.

V. How large is the fleet of lake carriers? What is its tonnage and what are some of its records? (Consult "Annual Report Lake Carriers' Association 1941")

A. The Lake Fleet
   1. Gross tonnage of the fleet
   2. The registry of vessels
      a. Number of vessels of United States registry
      b. Number of vessels of Canadian registry
   3. Number of bulk freighters in iron trade
   4. Number of bulk freighters in mixed trade

5. Number of package freighters
6. Number of oil tankers
7. Number of car ferries

N.B. What is gross tonnage? What is registry?

B. Records.
   1. Loading and unloading records in amount and in time
      a. Iron ore
      b. Coal
   2. Cargo records and dates
      a. *SS Harry Coulby*
      b. *SS Lemoyne*
      c. Any others

Fig. 3. The *Grand Island,* an ore freighter

VI. How are ships routed on the Great Lakes and how long does it take them to complete a round trip?

A. The following data were secured from the "Marine News" for August, 1941

The *SS Gleneagles* (Canadian Registry)
Cleared Duluth with *ore* on August 2d
Passed Sault Ste. Marie (down) on August 3d at 10:00 P.M.
Passed Detroit (down) on August 5th at 5:30 A.M.
Arrived Conneaut on August 5th
Cleared Conneaut *light* on August 5th
Arrived Ashtabula August 6th
Cleared Ashtabula with *coal* for Hamilton on August 6th
Passed Port Colborne (down) on August 6th at 9:55 P.M.
Passed Port Colborne (up) on August 9th at 5:10 P.M.
Arrived Toledo *light* on August 10th
Cleared Toledo with *coal* on August 10th

Passed Detroit (up) on August 10th at 5:00 P.M.
Passed Sault Ste. Marie (up) on August 12th at 3 A.M.
Arrived Ashland
Cleared Ashland with *ore* for Hamilton on August 14th
Passed Sault Ste. Marie (down) on August 15th at 9:30 P.M.
Passed Detroit (down) on August 17th at 5:30 A.M.
Passed Port Colborne (down) on August 18th at 4:35 A.M.
Passed Port Colborne (up) on August 20th at 7:50 A.M.
Arrived Toledo *light* on August 21st

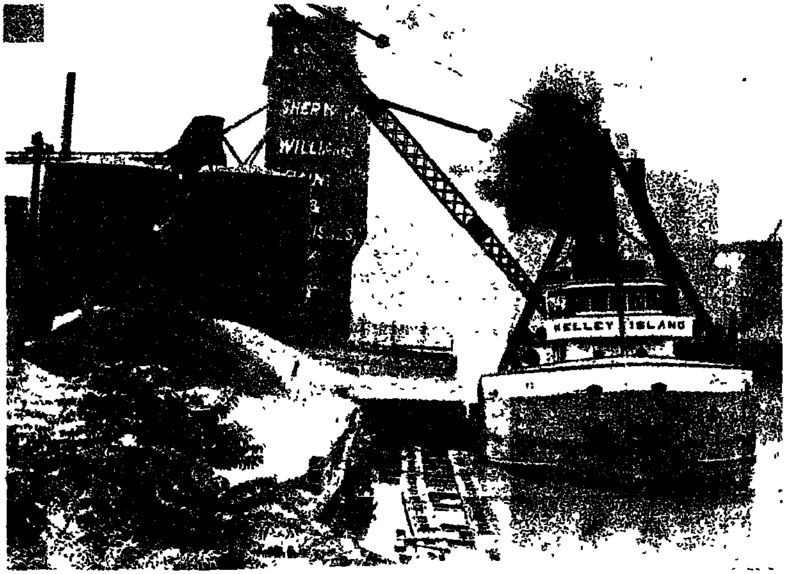

Fig. 4. The *Kelley Island* unloading sand

Cleared Toledo with *coal* on August 21st
Passed Detroit (up) on August 22d at 8:40 A.M.
Passed Sault Ste. Marie (up) on August 23d at 7:00 P.M.
Arrived Duluth on August 25th
Cleared Duluth with *ore* on August 26th.
N.B. Locate all places mentioned in this record. Add new ones to your outline map.
What is meant by "up" and "down" when applied to Sault Ste. Marie, Detroit, and Port Colborne?

B. From the above data secure answers for the following:

1. What was the sailing time between Sault Ste. Marie and Detroit?
2. What was the sailing time from Detroit to Port Colborne?
3. How much time was needed for the ship to pass Port Colborne, reach Hamilton and return to Port Colborne?
4. What waterway was used between Lake Erie and Lake Ontario?
5. What cargoes were carried to Hamilton? Where were they secured?
6. What do these cargoes suggest concerning work carried on in Hamilton?

7. What do these cargoes suggest concerning Canadian resources?
8. Suggest why the ship returned light from Lake Ontario?
9. Why were Lake Erie ports good places to secure return cargoes? What cargo?
10. How many days elapsed from time ship cleared Duluth on August 2d until it arrived in Ashland?
11. How many days from the time it cleared Ashland until it arrived in Duluth?
12. How many round trips to Lake Superior ports within the month?

VII. What are some of the problems that confront the carriers of heavy raw materials on the Great Lakes? (Consult "Annual Report Lake Carriers' Association 1941")

A. An uncertain season of navigation

1. Length of the open season
   a. What is the average length of the open season?
   b. What bearing does the length of season have on shipping?
2. Opening of the season
   a. What is the earliest opening date for Lake Superior ports?
   b. Why do opening dates vary from year to year?
   c. How have ice breakers aided in opening navigation?
   d. What is the earliest opening date for Lake Erie ports?
   e. Why is Buffalo ice bound later than Cleveland?
3. Closing of the season
   a. What is the earliest date Lake Superior ports have closed?
   b. What is the latest date they have closed?
   c. Why does shipping continue longer on Lake Erie?

B. A tremendous tonnage to be carried quickly

1. How many tons of shipping passed thru the locks of the American canal at Sault Ste. Marie in 1941?
2. How many tons thru the Canadian canal?
3. What commodities were handled?
4. How does tonnage handled at Sault Ste. Marie compare with that at Panama?
5. How does tonnage handled at Sault Ste. Marie compare with that at Suez?
6. How many tons of shipping passed thru the Welland Canal?
7. What commodities were handled?
8. How many tons of shipping passed thru the New York State Barge Canal?
9. How is this shipping related to that of the Great Lakes?

C. "Bottlenecks" that slow movement of materials

1. Canals at Sault Ste. Marie
   (Consult "Marine News" October 20-21, 1941)
   a. How many locks are available? Sizes? Names?
   b. Can more than one ship be locked thru at one time?
   c. How long does it take to lock a ship thru?
   d. What delays may be experienced at the Soo?
2. Detroit River
   a. What is the "up" channel?
   b. What is the "down" channel?

c. What delays are sometimes experienced here?

3. Welland canal
   a. How many locks in this canal?
   b. How long does it take to lock a ship thru?
   c. What size ship can be accommodated?

D. Varying lake levels

1. What bearing does precipitation have on lake levels?
2. How do lake levels affect draft of lake vessels?
3. How does draft affect tonnage carried?
4. What usually controls the safe draft to and from Lake Superior?
5. Why is the Detroit River a factor in determining drafts to the lower lakes?

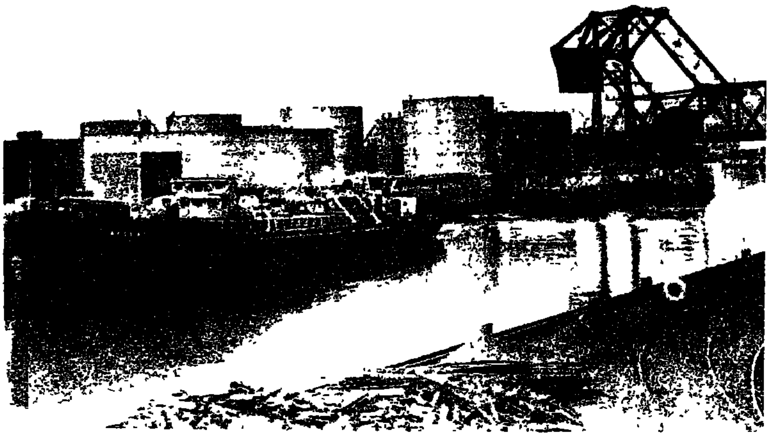

Fig. 5. The *Regent* and *Paratex* at Gulf Refining Company

6. What bearing does depth of water in harbor of destination have on load carried?

E. Uncertain weather conditions

1. How do winds, fogs, ice and cold affect shipping?
   (Consult "Marine News" October and November, 1941)
2. What hazards do ships face at beginning and close of the season?
3. How do insurance rates reflect these hazards?
   (Consult "Marine News" November 22-23, 1941)
4. What Weather Bureau and Storm Warning Service is maintained for lake shipping via Radio Phone?

VIII. Summary of findings concerning bulk freight trade on the Great Lakes

A. State reasons why

1. The chief tonnage is bulky, raw materials.

2. Speed is essential in the movement of these raw materials.
3. The greatest movement of raw materials is from west to east.
4. The greatest tonnage handled is iron ore.
5. Vessels frequently return light to upper lake ports.
6. The canals at Sault Ste. Marie handle greater tonnage than the Welland Canal.
7. Weather is the key to Great Lakes shipping.
8. Insurance rates on lake vessels expire after midnight on November 30.
9. Many vessels bring wheat down the lakes as the last cargo of the season.
10. Wheat is an important shipment from Buffalo eastward on the New York State Barge Canal.
11. Coal is an important shipment thru the Welland Canal.
12. Coal is an important shipment to ports on Lake Superior.
13. Petroleum is shipped from Indiana Harbor and Toledo.
14. Coal and petroleum are late season cargoes on Lake Erie.
15. Toledo is the largest coal shipping port on the Great Lakes.
16. Buffalo is the largest anthracite coal shipping port on the lakes.
17. Chicago became an important sulphur shipping port in 1941.
18. Corn shipments are made from Chicago but not from the grain ports on Lake Superior.
19. Vessels find it difficult to pick up return cargoes at ports on Lake Ontario.
20. The southern shore of Lake Erie is a focal point for lake shipping.

B. On not more than one typed page, state the outstanding features of the bulk freight trade on the Great Lakes.

IX. Some helpful supplemental readings:

Beasley, Norman. *Freighters of Fortune*
Channing, Edward and Lansing, Marion F. *The Story of the Great Lakes*
Curwood, James Oliver. *The Great Lakes*
Hatcher, Harlan. *The Great Lakes*
Hatcher, Harlan. *Lake Erie*
Havighurst, Walter. *The Long Ships Passing*
Wallen, James. *Cleveland's Golden Story*
Williams, Ralph D. *The Honorable Peter White*

THE STUDY OF CITIES AS A CONCLUDING UNIT IN ECONOMIC GEOGRAPHY

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THE PROBLEM

Doubtless most teachers of geography in secondary schools[1] have sensed the difficulties involved in concluding a course in economic geography in a thoroly satisfactory manner. Careful planning is required to bring the course to a close with a unit that is a fitting climax, and that provides, in addition, a thoro overview and summary of the preceding work.

The common lack, in geography, of a cumulative building up of facts and ideas grows in part out of the very nature of the subject. Instead of each topic or problem resting firmly on the preceding ones, it is more often true that each, tho related to preceding ones, stands more or less by itself. In the words of an observant college student, it is like climbing up and down a row of step ladders. Economy of learning as well as of interest makes desirable, wherever possible, a progression, a pyramiding of topics and problems. Especially does it seem desirable to have at the end a unit which depends on the preceding ones for a large part of its basic facts and ideas.

The failure to use the major findings of each division of the work in the division immediately following also makes a thoro review highly desirable if not imperative. All experienced teachers of geography know that repetition of basic data is essential, and that a review after the whole field has been covered is particularly valuable. To secure a *review* that is a *new* view of the major items, a view that will be stimulating and yet not too diverting, is a vital part of the problem.

A review, moreover, needs to be narrowly selective—a summation. Much of the factual material in geography is so much water to make the wheels of the mind go round—it is not to be recalled. It has done its work. Some kind of a procedure that will pick out the highlights should be adopted. If this can be incorporated as a part of the concluding unit, it is easier to enlist the whole-hearted cooperation of the students.

[1] Junior and senior high school and junior college.

URBAN GEOGRAPHY OFFERS A SOLUTION

The writer has experimented with various solutions to this need for a closing topic that gives a vigorous review of the essential facts and ideas, and that constitutes a fitting climax to the course. Among the more workable have been: (1) journey geography, (2) an analysis of the interdependence of regions, largely thru trade, and (3) a study of cities. The appropriateness of any one of these will depend, of course, on whether its novelty has been exhausted earlier in the work. This discussion will develop the use of the third, city or urban geography.

The method is, in brief, to select representative or outstanding cities for study as the last phase of the work. For systematic economic geography, the choice might well be made from a list of the cities of more than one million population. These will be found to reflect quite accurately the major items in economic geography. For the geography of a continent, it seems desirable to keep to cities of one hundred thousand or more, the so-called "great cities." For a state, the most useful list consists of the larger urban centers and of a sufficient number of the smaller ones to give representative cities from the contrasted regions of the state.

THE MERITS OF THE PLAN

A study of selected cities clearly meets our requirements for a concluding unit. Each city epitomizes the region of which it is the dominant trade center, and in its trading and manufacturing activities reveals much about distant areas; one can hardly understand a city without calling to mind, *reviewing* from a *new* viewpoint, the major facts about the region it serves. Thus the review and summary are secured. But more than that, some new material is introduced which builds on that which has preceded, thus giving a pyramid cap to the broad regional or topical foundation laid in the preceding weeks. These merits of city study depend, of course, on some of the basic facts of the human geography of the Twentieth Century—that the peoples of the commercial world are pretty largely nucleated in cities, which must of necessity reveal the character of the peoples and lands of which they are the centers of industry, commerce and communication. This urban dominance is notably characteristic of the United States and Canada, the Plata River Countries, Australia, and Western Europe.

Another merit of city study as a culminating topic in economic

geography is the ease with which it can be carried out. Materials are commonly available for cities even tho lacking for the region to which they belong—photos, street maps, trade statistics, historical accounts, Chamber of Commerce publications, federal commerce reports, port descriptions. The student who takes a city as a special topic on which to report is certain of some measure of *success* in his search for materials.

TEACHING THE UNIT ON CITY GEOGRAPHY

The successful direction of this unit involves an acquaintance with the available source materials and with the capacities of the participating students. These vary so widely that it is difficult to generalize. The teacher can, perhaps, assign readings as the basis of discussion; he can develop the whole topic by skillful questions, by drawing out what the pupils know of the tributary area of the city, and by filling in with data of his own; he can resort to the easier method of "telling," or reading aloud particularly good selections; or he can have oral reports by members of the class on selected cities.

In directing the preparation and presentation of the oral reports, it is desirable to make the individual assignments near the middle of the course, after the work is well under way and the capacities of the individual students are known, but early enough to give plenty of time for the search for data. It generally proves best, moreover, to assign each city to an alert student who stands in the upper third of the group, or to a committee with such a student as chairman. A study guide should be provided, indicating what to look for and where to find it. A summary of findings, in the form of a series of short statements (a "brief"), is required of each committee a week or so before the unit on cities is taken up by the entire group. If not satisfactory, it may be returned for further work. From the accepted briefs, the teachers can select the cities on which oral reports are to be made. Perhaps some of the studies are so imperfect that they are not worth presenting. The oral report may cover the subject matter of the entire brief or it may consist of the portion which in the teacher's judgment is most worthwhile. Very commonly it is best to restrict the oral reports to the more valuable portions of the better briefs. All of these steps are doubtless clear enough except, perhaps, the content of the study guide.

A STUDY GUIDE FOR ORAL REPORTS

The study guide, which may be dictated, posted on a bulletin board, or mimeographed, should include specific directions to the available sources (which vary widely from school to school), and a set of questions or problems to guide the students in their work. Altho the list of problems may well be fairly comprehensive, it should be remembered that some of them may have to go unanswered, and, moreover, that the brief or summary of findings need not follow precisely the outline suggested by the problems.

Of the possible problems in harmony with the objectives of the unit we select seven, all of them aimed at revealing the city as an organic unit epitomizing the geography of the region it serves. (1) What does the city look like (the *landscape*)? What is its shape, its street pattern; of what contrasted districts, such as commercial and manufactural, is it composed? (2) What is the nature of the area which the city occupies (the *site*)? What have been the good and bad features of the site for urban use? (3) When was the city started and why was this particular site chosen (*origin*)? (4) How has the city grown to its present size and importance (*evolution*)? What stages in its growth can you discover? How are they related to the development of the region in which it lies? (5) How do its people make a living today (*function*)? Consider trade, manufacturing, and other functions such as political and educational. (6) How is the city located with respect to raw materials for manufacture, power resources, richly productive lands, trade routes, and so on (its *situation*)? How are the activities (functions) of the city related to these resources and to the needs of the near-by and more distant lands and peoples. (7) What problems more or less peculiar to the city and its region are faced? (e.g. water supply for Los Angeles, flood control for New Orleans).

The problems selected, the local library resources, and the capacities of the students, will dictate the sources to be listed in the study guide. Encyclopediae and articles in current magazines, such as *The American City* and *Literary Digest*, are available where there is a good library. The *Readers Guide* is an invaluable aid in locating current magazine articles on cities. Among the geographical magazines the *National Geographic* and the *Journal of Geography* are especially useful. Maps in geography texts and atlases show major elements of situation. Accounts in history texts and local histories

throw light on the evolution, as do the census reports. Federal reports, especially those for ocean ports, are invaluable. Topographic maps, obtainable for many cities from the United States Geological Survey for ten cents a sheet, commonly give many of the critical details of site, and Chamber of Commerce and Board of Trade publications can be relied upon for maps, photographs, and ideas, tho all factual statements must be used with caution. Commonly much of the material used in the earlier part of the course can be used again in this connection. Careful provision of suitable source materials for the cities assigned is essential to the success of a study of cities as the culminating unit in a course in economic geography.

PART FOUR

GLOBAL GEOGRAPHY

Today, owing to modern means of communication and transportation, the earth, its resources and its peoples are a related organic whole. Thus the individual's environment has so widened that he must not only adjust himself and his activities to the natural and cultural factors within his own immediate locality, but to an ever widening environment which includes the whole world. The above fact means that the individual must think in terms of the whole world — its lands and its people.

Within the high school program, the student needs a geography course which will help him to realize that man lives and works upon a giant sphere and that everything on the earth, both man-made and nature-made, is tied together by millions of threads. Many of these threads are invisible; but they interlace to form numerous world patterns, just as the various colored threads in a piece of cloth are interwoven to form designs. The problem of the high school teacher is how to organize a geography course on the high school level which will help the student to gain an understanding and apprecia tion of *"the earth, its resources and its peoples as a relat organic whole."*

The selections in this section on Global Geography not solve the problem for the teacher, but they do show hc some high school teachers have faced the problem and how they have organized units in such courses. Whatever the pattern of organization, the materials in such a course in global geography should be so selected, organized and presented as to help the student in gaining the following understandings:

1. How man is basically dependent upon the physical world — climate, topography, soil, water, minerals, and other elements of the physical environment.
2. How man is an active agent in changing his physical environment for better or for worse.
3. How man's traditional or cultural inheritance affects his reaction to his physical environment and also his reaction to other peoples.

Such geographic understandings should aid the student in comprehending the complex interdependent world of today. He can understand and evaluate the affairs of the modern world only when he knows the characteristics of the physical and cultural environments in which the various peoples live.

GEOGRAPHY IN THE NEW KENSINGTON HIGH SCHOOL

Mary Viola Phillips
New Kensington, Pennsylvania

This World War II made the educators at the head of our New Kensington Public School System alert to the need for geographical training for high school students. They saw that a knowledge of geography was needed by our young people if they were to solve their problems adequately. They not only felt and saw the need, but they did something about it.

The Courses

Two courses were instituted: one, *Global Geography* and the other, *Geography of the Americas.* These courses were offered for the first time during the second semester of 1943-44. The units included in these courses were organized around problems that were pertinent and important in the present state of the world and in looking forward to the kind of world we hope to have.

The course in the *Geography of the Americas* was offered to members of the junior class. The course in *Global Geography* was offered to the senior class. We had expected the enrollment to be approximately 22 for each class, but when registration closed we had 40 pupils in each one.

In order to span the hiatus in the education of high school students, who had had no opportunity to study geography since leaving the grades, the course in Global Geography served a much needed purpose. The objectives of the first units of work were to acquaint students with the tools of geography, especially the globe and measuring tape, the atlas, the different map projections, and the various kinds of maps and their uses.

The Content of Some of the Units

In our first unit *The Introduction to the Earth* we made a study of the size and shape of the earth, its movements and their results, its land and water masses and how they are grouped, the help that a navigator gets from a knowledge of the sun, moon, and stars, systems of locating places upon the earth, and many other things so that we may effectively use our newest mode of travel—the airplane. Such items as flying time and distances compared with ocean

sailings, polar projections, limitations of the mercator map and use of the globe were studied rather intensively.

Pupils were taught to measure great circle routes and to compare them with the same routes on the flat map projections. This was aimed at understanding the impact of modern aviation on global distances and its importance to American isolationism.

The second unit was a study of *Climate and Weather*. The study of weather proved a very fruitful topic. The air in which we live is the qualifying factor of human life. The objectives of this unit were to enrich the students' life by admitting him into the "inner sanctum" of the why of weather, to instill respect for the laws of nature, to master certain weather instruments, to collect weather data, organize and classify data, to develop an interest in forecasting, evaluating and interpreting the significance of weather data applied to human activity, and to develop an appreciation of the climates of the world. In developing this unit official weather maps and forecasts were employed to great advantage.

In our third unit we made a study of the *Press of Population on the Land*. In this unit we studied facts concerning the distribution of people, where the most densely populated regions of the world are located, the ability of certain regions to support people, division of land among nations, geographic factors that have influenced the spread of people over the land, significance of the so-called marginal lands for the future, and the effect that air travel will have on regions heretofore considered of little value.

The remaining units for the semester were based upon a study of the war fronts. Every effort was made to relate these units to the students' interest. The interest of most of the students had turned to the Pacific area. We studied the physical setting, natural and cultural conditions, economic responses, and international relationships of the areas they selected. They made a survey of current events daily. The constant use of maps while studying the war fronts kept the interest of the students at high pitch.

The scope and content of all the units taught required a relative maturity of thought. At first I was afraid that the material included in the units would be too easy and I did not wish to waste time in repetition. The first few days the students came into the class with a know-it-all attitude, but in less than a week their attitude had changed. Most of the material was new to the students. Most of them had forgotten all the geography that they had learned

in the grades. The longer we worked together, the more convinced I became that geography is a subject that can be fully understood by only the more mature minds of high school students.

Map reading deficiency existed. Getting facts from parallels and meridians is one of the basic skills involved in the correct use of maps. Every student in the class either lacked this particular ability or only partially understood it, and failed in its utilization. They admitted that they had never really understood their use or had forgotten. Tests indicated that there were many incorrect impressions in the use of map symbols and in their application. Some of the questions they asked proved definitely that I did not need to be afraid of my units being too easy.

MATERIALS

The matter of materials for teaching the units presented certain difficulties. A workman cannot do a job if he does not have tools necessary to the completion of a piece of work. A teacher is no exception to the rule. At first we had to work with a limited amount of material, because some of our orders were not filled until the semester was well on. However, we were successful in getting a number of reference maps and atlases. The newspapers, pamphlets, bulletins, and magazines were full of present-day material to supplement that of the references. Mimeographed materials were made available to the class. The students, too, were quite successful in locating publications and in obtaining copies for our classroom files.

The administrators have gone all the way in supplying equipment. Our workshop now contains a 16 inch physical-political cradle type globe and a few smaller globes. The smaller globes have been brought in by the students. We have outline maps, a collection of United States Weather Bureau maps and publications, reference books—several full sets, a physical political map of the world and maps of all of the continents, a polar projection map, a Pacific Area map, and atlases. We have enough copies of Goode's School Atlas to supply each member in the class with one. The outline desk maps are mimeographed. We also have a sound projector and a lantern for showing pictures.

METHOD

Shortness of time and fullness of schedule necessitated careful planning of subject matter and teaching technique. The workshop

proved to be the best method in teaching the units. This method offered the opportunity for fixing fundamental and basic facts and for caring for all variations of ability and interests. This method was new to them, but the students soon adjusted themselves to workroom routine and learned to work systematically and efficiently. Workshop technique does require a period of training for the pupil.

Assignment sheets for each unit were worked out and mimeographed. These enabled the students to go ahead on their own initiative, eliminating the necessity of continually stopping to wait for some slower pupil, or hurrying to catch up with the faster ones. Once they got interested, some of them covered the whole unit at once, and then went back thru it to master the details and to perform particular activities required of them.

The classroom is the average type with stationary furniture, but we turn the room back and forth at will from a workshop to the conventional recitation room. Supplies are set out for use and put back on the shelves of the supply cupboard by pupils chosen for that service. The first class set out the supplies and the last class put the supplies away. Most of the students liked the workshop idea and worked enthusiastically on their particular problem and their work showed good organization and thoro preparation.

In order that the laboratory work be most efficient it was correlated closely with work done in class recitation. At times the whole class was called together while new things were explained and new processes demonstrated. Discussions were held at times so that the meaning of the activity could be realized.

The main reason for the success of the workshop was the stimulation given students who were usually observers rather than contributors. Pupils of limited ability felt their work was challenging and of practical value.

Certain phases of the units were taught using the technique of discussion, round table and panel. Such discussions did not compare with adult standards, but they were spirited, sincere, and based on study.

THE GEOGRAPHY OF THE AMERICAS

It will be impossible to give a detailed account of the units of work covered in our class in the *Geography of the Americas* at this time. In our study of the Americas we used the problem approach to each unit. The study of the urgent problems of the day aroused

interest and stimulated thought. However, factual background and development of understandings and attitudes were not neglected.

SUMMARY OF REACTIONS

The students evinced a keen interest in all phases of world geography. The study of regional geography aroused unusual interest in the students. They had found their own incentive because almost everyone had a friend or relatives in some distant part of the world. They were curious about the places where their friends were stationed. They wanted to know where these places were and what they were like. The pupils kept a record of happenings in the different war areas and the events were discussed by the class.

A large number of the boys who were to be future aviation students seemed extremely anxious to take advantage of the opportunity to learn, and were both conscientious and cooperative in their attitude toward and participation in the course.

Altho some of the students entered the geography class for the purpose of satisfying credit requirement, the response of the class to the course was most gratifying. Most of them were deeply interested and many did much more work than was required.

At the end of the semester many endorsed it heartily and advocated that their friends enroll the next term. As a result I have two large classes in Global Geography and a class in the Geography of the Americas this year.

The courses we offered last year were half-year courses but this year they are being offered as full year courses. However, they are being offered as electives.

The students enrolled in my classes this year, as far as I can determine in the few weeks we have worked together, have shown a very real interest in the subject.

A review of students' reactions would not be complete without reading a few statements taken from papers written by the students of my present classes, on the topic "Why the Present Interest in Global Geography." Here are a few typical responses:

"An understanding of the geography of all nations of the world will make things easier for international relations."

"By studying about different people we can understand them better and by understanding them we can live peaceably together."

"In order to keep up with the war and help make the peace we have to know more about our world."

"Since we are air-minded and no longer isolated we will be all over the globe and we will need to understand the nations of the world."

"If everyone possesses a good knowledge of the countries and peoples of the world we may be able to prevent future world catastrophes."

"I want to learn about some of the places that are mentioned in the paper and on the radio."

"I would like to know the places and the people of those places where my friends are located."

"Geography fits in perfectly with my career. I am interested in airplanes and intend to join the Air Corps."

"If we study geography today we will be able to handle what lies ahead of us."

"I don't believe this interest in geography is only temporary."

"Every school should include a good course in geography along with other subjects offered."

"I think Global Geography should be a required subject rather than an elective."

"Geography in the high school has a great future."

CONCLUSION

The reactions of the high school students, both last year's students and my students this year, to geography have shown me that there is a definite need for a much broader and more inclusive program than anything we have had in the past.

In order to really satisfy the needs and interests of our youth today a number of separate and distinct courses in geography should be offered.

The tremendous present public interest in geography, the steps already taken to place geography courses into the senior high school, and the stimulus of post war treaties and boundary discussions all point the way to a great growth of the subject.

We should all begin at once to make plans to take full advantage of the opportunities at the secondary level of education.

UNIT I. FOR COURSE IN GLOBAL GEOGRAPHY OFFERED AT THE NEW KENSINGTON HIGH SCHOOL

MARY VIOLA PHILLIPS
New Kensington, Pennsylvania, High School

OUTLINE AND STUDY ASSIGNMENT FOR UNIT I: INTRODUCTION TO THE EARTH

I. Overview

The airplane has shrunk the world and has bound nations more closely together thereby necessitating a new geographical thinking and interpretation. Thus there is a need for accurate basic concepts of the earth, its size, shape, movements, directions and distances; to acquire a knowledge of location and character of the surface features of the earth in the light of their relationship to man's activity; to learn the technique of using maps, plotting data, and comparing maps; to develop in the students the consciousness of things which lie beyond his horizon, and to recognize the unity of the earth.

II. Outline

A. The Universe
   1. Meaning of Universe
   2. Size
   3. Composition
   4. Relation of our Solar System to it
      a. Theories as to origin
      b. Parts
      c. Position of Earth in the Solar System and its relation to the sun

B. The Earth—Size and Shape
   1. Sphere—spheroid
   2. Circumference—equatorial, meridianal
   3. Diameter—polar, equatorial
   4. Area
      a. Total area in square miles
      b. Area below ocean
      c. Area of land above ocean

C. The Sun
   1. Size and shape
   2. Weight
   3. Motion
   4. Temperature
   5. Distances from earth

D. Movement and Position of the Earth
   1. Position of earth's axis in degrees. Position of earth's axis at all time to the

plane of the elliptic.

2. Rotation on its axis
    a. Meaning of rotation and axis
    b. Direction it rotates
    c. Time it takes
    d. Result
3. Revolution of earth
    a. Meaning of revolution
    b. Direction
    c. Time it takes
    d. Result
4. Migration of vertical rays of sun
    a. Areas where vertical rays of sun strike the earth on the following dates: March 21; June 21; September 22; December 21
    b. Length of day at North Pole—during summer—winter
    c. Length of day at Arctic Circle June 21, December 21
    d. Length of day at South Pole during summer solstice—winter solstice—equinoxes
    e. Length of day at Antarctic Circle June 21, December 21
    f. Longest day in year in northern hemisphere—shortest day
    g. Longest day in year in southern hemisphere—shortest day

E. Grand Divisions of the Earth
1. Man in relation to the spheres
    a. Atmosphere
    b. Lithosphere
    c. Hydrosphere
2. Great Land Masses and Waterbodies
    a. Continents, islands, etc.
    b. Oceans, seas, bays, straits, etc.
3. Directions on the Earth
    a. Main directions
    b. Geographical Pole
    c. Magnetic Pole
    d. Clockwise
    e. Counter Clockwise
    f. Terms up and down—misuse

F. Location: Latitude and Longitude
1. Street System of earth's surface
    a. Parallel—latitude
    b. Meridian—longitude
    c. Division streets—equator—prime meridian
2. Latitude
    a. Meaning of Latitude
    b. Meaning of North Latitude
    c. Meaning of South Latitude
    d. Symbol used to indicate latitude
    e. Latitude of the following: Equator; Tropic of Cancer; Tropic of Capricorn; Arctic Circle; Antarctic Circle; North Pole; South Pole
3. Longitude
    a. Meaning of Longitude
    b. Meaning of East Longitude
    c. Meaning of West Longitude

d. Meaning of Meridian—Prime Meridian
e. Symbol used to indicate longitude

4. Longitude and Time
    a. Differences in time in United States
    b. Time Zones in United States
    c. Time Zones in the World
    d. Reasons for time belts
    e. International Date Line

G. Maps
1. Globe best source—only true map
2. Why flat maps are necessary—desirable features
3. Kinds of maps
    a. Physical
    b. Political
    c. Population
    d. Vegetation
    e. Contour
    f. Economic
4. Use of lines, dots, colors, and other symbols
5. Map projections. Advantages and disadvantages of four chief projections: Mercator; Gnomonic; Lambert unformal conic; Polyconic

H. Effect of Air Age
1. World is Shrinking
2. Transportation ,changes—Kinds and problems
3. Great Circle Routes
4. New direction concepts
5. New strategic areas

III. Study Assignment Sheet

Unit I. (Laboratory Work)

Introduction to the Earth

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The Earth as a Part of the Solar System

1. How many known planets are there? Name the planets—begin with the one closest to the sun and end with the one farthest away.
2. Draw a diagram showing each planet in its relation to the sun.
3. How far is the earth away from the sun? the moon? How does the earth compare in size with the sun? with the moon?

Shape and Size and Divisions of the Earth

1. What is the shape of the earth?
2. What is the size of the earth—equatorial diameter? polar diameter? meridianal circumference? equatorial circumference?
3. Does man live on the outside or inside of the earth? Prove your answer.
4. Approximately what percentage of the earth's surface is water? land?
5. What is the area of the earth's surface in square miles? How many square miles of this area lies above the ocean?
6. On an outline map of the world locate the following: (1) the seven continents, (2) the five great oceans, (3) the following islands: Greenland, Iceland, Madagascar, West Indies, East Indies, New Zealand, Aleutians, Newfoundland, Falklands, Philippines, Japan, Canary, Islands of Pacific (example—Hawaiian, New Caledonia, Gilbert, Marshall, Solomon, etc.), Islands of the Mediterranean, (4) Seas: Mediterranean, Caribbean, South China, East China, Black, Aegean, Adriatic, Red, Caspian, Arabian, Arafura, Timor, Celebes, Tasman, Coral, Sula, Baltic, North Sea, Sea of Japan, Bering, Yellow Sea, (5) Gulfs or Bays: Gulf of Oden, Persian, Bay of Bengal, Gulf of Aman, Gulf of Siam, Hudson Bay, Gulf of Carpentaria, Gulf of Finland, Gulf of Bothnia, (6) Straits and Canals: Bering, Gibraltar, Magellan, Bosporous, Davis, Denmark, Kiel Canal, Panama Canal, Suez Canal, (7) Important lines: Arctic Circle, Antarctic Circle, Equator, Tropic of Cancer, Tropic of Capricorn, Prime meridian, International Date Line.

Movements and Position of the Earth

1. How long does it take the earth to rotate once upon its axis? Define rotation, mentioning the direction of rotation.
2. Define revolution, mentioning the direction and the time it

takes.

3. What is the position of the earth's axis at *all* times to the plane of the elliptic?
4. How is the earth held in its orbit?
5. Mention a result of rotation. Mention a result of revolution.
6. Where does the vertical rays of the sun strike the earth on the following dates: March 21, September 22, June 21, December 21?
7. Name the spring, summer, autumn, and winter months for the northern hemisphere, for the southern hemisphere.

Location: Latitude and Longitude

1. Define: latitude, north latitude; south latitude.
2. What places on earth have the lowest possible latitude? highest possible?
3. What symbol is used to indicate latitude?
4. Find the latitude of the following: Equator, Tropic of Cancer, Tropic of Capricon, Arctic Circle, Antarctic Circle, North Pole, South Pole.
5. What is the specific latitude of New Kensington? Name two other cities in about the same latitude.
6. One degree of latitude equals approximately 70 miles (exact 69.172). How many miles north of the equator is New Kensington?
7. Latitude range: Between what two parallels of latitude do the following countries and continents lie? United States, British Isles, South America, New Guinea, Australia, Greenland, Japan, Russia, Italy, China, Brazil, Canada, Mexico?
8. What is the latitude of the following cities? Use map of United States.

Cities	Latitude
1. Philadelphia	
2. Pittsburgh, Pa.	
3. Chicago	
4. Boston	
5. New York City	
6. Denver	
7. Los Angeles	

8. Portland, Oregon
9. Detroit
10. New Orleans
11. Salt Lake City
12. Memphis, Tenn.
13. Springfield, Ill.
14. Baltimore

Name 5 cities lying near 40° north latitude
Name 3 cities lying near 45° north latitude
Name 4 cities lying near 35° north latitude
Name 3 cities lying near 30° north latitude

9. Define: longitude, meridian, east longitude, west longitude.
10. What points on the earth have the lowest possible longitude? greatest possible?
11. How does the arrangement of meridians differ from that of parallels of latitude?
12. Find a place on the earth having 0° 00′ 00″ latitude and 0° 00′ 00″ longitude.
13. What meridian of longitude does New Kengsington lie near?
14. Longitude range: Between what two meridians of longitude do the following countries lie,—Alaska, United States, Brazil, Russia, Siberia, India, Dutch East Indies, Germany, and China?
15. How many degrees east of London are these cities—(Use map of Europe) Belgrade, Budapest, Hamburg, Munich, Rome, Leningrad, Archangel, Oslo, Helsingfors, Paris?
16. Six airplanes have radioed their positions as follows. What countries are they near?

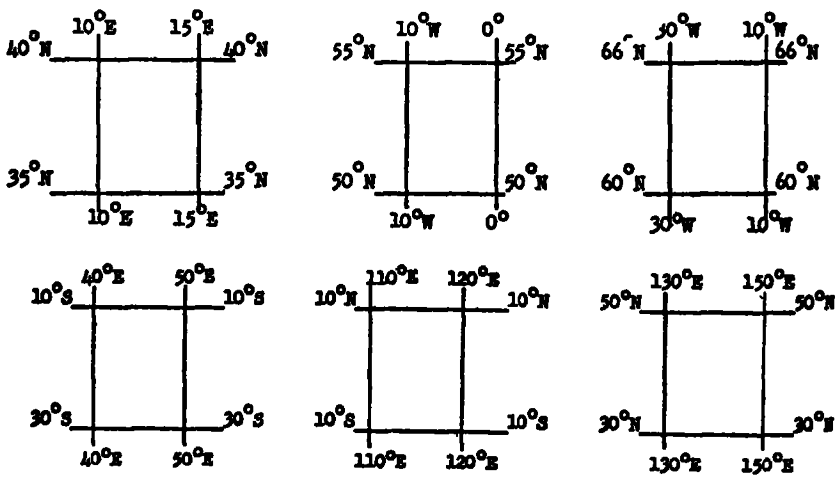
Latitude	Longitude	Countries
15° S	35° W	
50° N	135° W	
20° S	160° E	
30° S	80° W	
10° S	20° W	
35° N	70° W	
20° N	95° W	
10° S	80° W	

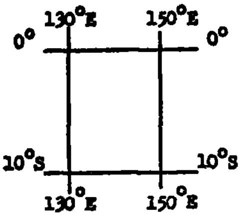
55° N	5° E
20° S	60° E
50° N	140° E
10° S	80° E

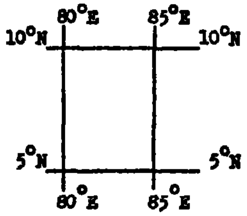
17. A city can be found at or close to the point where the latitude and longitude lines intersect.

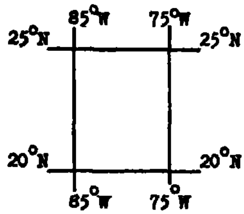
Latitude	Longitude	Cities
30° S	151° E	
30° N	90° W	
37° N	123° W	
47° N	71° W	
22° N	88° E	
43° N	132° E	
12° S	131° E	
42° N	88° W	
34° S	58° W	
41° N	74° W	

18. Locate, sketch in, and name an island indicated by the parallels and meridians below. Use World Map. Goode's Atlas.









19. Tokyo is at a latitude 35°N and longitude 140°E. Suppose Major General Doolittle and his bombing squad had taken off from a base at latitude 15°N and 120°E,—where was the base located and what direction would he have flown?
20. London is about 52°N and 0° and Berlin is about 52°N and 18°E. How far is Berlin from London?

Longitude and Time

1. Make a map of the world showing time zones. Make a map of the United States showing the time zones.

When it is—	What time is it in?
7 P.M. in New Kensington	__________London
2 P.M. in London	__________New Kensington
12 noon in New Kensington	__________San Francisco
12 noon in San Francisco	__________Denver
4 A.M. Sydney	__________New York
12 noon San Francisco	__________Shanghi
1 P.M. Chicago	__________Tokyo
6 A.M. Washington, D.C.	__________Berlin
5 A.M. Honolulu	__________Tokyo
10 A.M. Rome	__________New Kensington
2 A.M. New York	__________Moscow
12 noon London	__________Leningrad

2. Choose 10 different cities of the world in various standard time belts. Draw ten clocks showing correct time at the same instant.

Map Projection

1. Why is the globe the best source for studying the world?
2. List five methods of map projection. Tell the advantages and disadvantages of the Mercator projection. Goode's *Atlas* p. 2 and *Globes, Maps and Skyways*, Bauer p. 26 ff.

Important Terms to Identify

1. universe
2. environment
3. geography
4. global
5. sphere
6. spheroid
7. hemisphere
8. planet
9. diameter
10. circumference
11. magnetic
12. axis
13. topography
14. meridian
15. prime meridian
16. parallel
17. equator
18. Solar
19. latitude
20. longitude
21. gnomonic
22. mercator
23. polyconic
24. orbit
25. nautical
26. projection
27. conformal
28. International Date Line
29. Tropic of Cancer
30. Tropic of Capricorn
31. contour
32. Arctic Circle
33. Antarctic Circle
34. degree

Activities or Work Projects

1. From the newspapers today, in connection with the war news, list 25 cities. Write the name of the country they are located in and give the approximate latitude and longitude of each place.
2. Draw a polar projection map. Locate the continents and 25 of the largest cities in the world. (Use *New World Horizons*, Lawrence p. 12; *Our Global World*, Engelhardt; *Maps*, Consolidated Vultee Aircraft Corporation.)
3. Write a report and be prepared to give a floor talk on the following topic: "The World has Shrunk." *Our Global World*, Engelhardt p. 25-34.
4. Indicate by drawings the relation of the sun to the earth on March 21, June 22, September 21, and December 22. (Page 1, Goode's *Atlas*.)

UNIT II: CLIMATE AND WEATHER FOR COURSE IN GLOBAL GEOGRAPHY*

MARY VIOLA PHILLIPS
High School, New Kensington, Pennsylvania

I. OVERVIEW

Man inhabits and is physically adapted to living at the bottom of a vast ocean of air. The variable character of this air ocean reaches into our lives in hundreds of ways. It affects the clothes we wear, the kind of homes we live in, the kind of work we do, the cost of our food, our health and our habits.

A study of the climatic facts and ideas facilitates international and inter-continental comparisons and enables man to understand his world more fundamentally.

II. OUTLINE OF SUBJECT MATTER

A. The Atmosphere

1. Composition of the atmosphere—gases and other matter
2. Extent of the atmosphere
3. Parts of the atmosphere and the characteristics
    a. Troposphere—tropopause
    b. Stratosphere—stratopause
    c. Ionisphere—ionopause
4. Temperature of the atmosphere
    a. Measurement of
        (1) Thermometer (various scales)
        (2) Thermograph
    b. Variability of
    c. Isotherms
    d. Effect of rise in altitude—lapse rate
5. Pressure of the atmosphere—a manifestation of weight
    a. Measuring air pressure
        (1) Barometer—mercurial—aneroid
        (2) Barograph
        (3) Altimeter
    b. Relations of temperature to air pressure
    c. Isobars
6. Moisture of the atmosphere
    a. Measurement of
    b. Variations in amount
    c. Capacity for water vapor—saturation—humidity—relative humidity—absolute humidity
    d. Fogs
        (1) Formation

* This course is offered in the high school, New Kensington, Pennsylvania. See JOURNAL for September and November, 1945. Editor.

(2) Kinds—radiation—advection—monsoon—sea—interior—frontal

e. Clouds

(1) High Clouds—cirrus, cirrocumulus, cirrostratus

(a) Height and composition

(2) Middle Clouds—altocumulus—altostratus

(a) Height and composition

(3) Low Clouds—stratocumulus—stratus—nimbostratus

(a) Height and composition

(4) Clouds and vertical development—cumulus—cumulonimbus

(a) Height and composition

B. Role of Sun in Producing Weather

1. Unequal insolation
   a. Movement of earth around sun
   b. Inclination of earth axis
2. Transfer of heat by—radiation—conduction—convection

C. Wind System of the World

1. Effect of the earth's rotation—speed of rotation at equator—speed of rotation at poles
2. Circulation of air in the Northern Hemisphere—in the Southern Hemisphere
3. Velocity
   a. Methods of measuring
   b. Beaufort Scale
4. Effect of unequal heating of oceans and continents on wind circulation
   a. Monsoon circulation
   b. Land and sea breezes
   c. Mountain and valley breezes
5. Location and climates of the world wind belts

D. Ocean Currents and Drifts—one of the controls of climate

1. Causes—prevailing winds—rotation of earth—shape of continents
2. Warm and cold currents
   a. Low latitudes
   b. Middle and Higher latitude
3. Climatic significance

E. Air Pressure and its Effect on Weather

1. Meaning of high and low air pressure
2. "Highs" and "lows" or cyclones and anticyclones
   a. Movement of air
   b. Path of these storms
   c. Characteristics of
   d. Frequency and speed
3. Weather map

F. Weather Observations and Records

1. Collection of data
2. Preparation of maps, charts and diagrams
3. Predicting
4. Surface observations and upper air observations

G. Significant Human Aspects of Climate and Weather

1. Relation to population distribution
2. Relation to human occupations
3. Relation to health and energy
4. Climate and homes
5. Weather and human well being

III. STUDY ASSIGNMENT SHEET

Unit II (Laboratory Work)

Climate and Weather

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1. What is weather? What is climate?
2. Name the three layers of our atmosphere and give the characteristics of each layer.
3. Draw a diagram showing the composition of the atmosphere.
4. Draw a diagram showing our planet as a solid ball inside three shells of atmosphere.
5. How do we measure air pressure?
6. What is the average weight of atmosphere at sea level?
7. What are contour lines? Make a contour map of a hill.
8. Describe the winds of the North Atlantic. Describe the world wind system. Show by diagram the winds of the lower troposphere. Make a diagram to show prevailing winds for the Southern Hemisphere.
9. How does the rotation of the earth affect the direction of the winds? Identify and account for the direction of air flow in each of the following: a. prevailing winds b. trade winds c. antitrade winds d. polar easterlies e. horse latitude f. doldrums.
10. Name the six great air bodies that are makers of American weather.

11. What is a high pressure area? Describe wind directions in a high pressure area. Describe weather in a high pressure area.
12. What are cyclones? What are anticyclones?
13. What is a low pressure area? Describe the wind direction in a low pressure area. Describe the weather in a low pressure area.
14. Draw a diagram of a high pressure area "Air hill," a low pressure area "Air Valley" by means of contours of pressure. What are isobars? Show movement of air in high pressure and low pressure areas by means of arrows.
15. Give the altitude ranges and composition of the different types of clouds. What are the distinguishing characteristics of each cloud type? Of what value is each cloud type in giving some clue about weather changes. Make a collection of cloud forms.
16. What are ocean currents? How do oceans influence the climate of the land? Locate the ocean currents on a map of the world.
17. What is a tundra? What type of homes are found in the tundra? List the natural conditions that have influenced home building.
18. Describe the homes of Alaska, Russia, Egypt, southern California and list the climate conditions that have influenced home building in each area.
19. Give specific illustrations of the influence of weather and climate upon human occupations.
20. How does climate affect man in the tropics? temperate zones? polar zones?
21. On a map of the world draw and name the climatic regions of the earth.
22. What steps are involved in forecasting? Who are benefited by forecasts? What information must weather stations collect? How are upper-air observations made? Why are they important?
23. Prepare a floor talk on the United States Weather Bureau and be prepared to present it to the class or to hand it in.
24. Study weather maps—without isobars—with isobars. Notice paths of cyclones and anticyclones. Study the Beaufort scale at bottom of weather maps.

Below are tables showing the temperature and rainfall of five cities located in different climatic regions of our world. Make a graph for each city using the data in tables below.

1. Low lattitude wet regions
Para, Brazil
1° 28′ S., 48° 29′ W., Altitude 33 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall	12.7	13.9	13.9	13.1	9.4	5.9	5.2	4.7	3.7	3.3	2.1	6.0
Temperature	75	77	77	77	79	79	79	79	79	79	79	79

2. Low latitude wet and dry regions
Calcutta, India
22° 32′ N., 88° 20′ E., Altitude 21 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Fainfall	0.4	1.0	1.3	2.3	5.6	11.8	13.0	13.9	10.0	5.4	0.6	0.3
Temperature	65	70	79	85	85	84	83	82	82	80	72	65

3. Low latitude dry regions
Aswan, Egypt
24° 2′ N., 32° 53′ E., Altitude 363 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfal	0	0	0	0	0	0	0	0	0	0	0	0
Temperature	61	66	72	81	86	91	91	91	90	84	73	64

4. Middle latitude Mediterranean type
Rome, Italy
42° 15′ N., 12° 15′ E., Altitude 164 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall	3.1	2.5	2.7	2.7	2.3	1.6	0.7	1.1	2.8	4.6	4.6	3.5
Temperature	44	47	51	57	64	71	77	76	70	62	52	46

5. Middle latitude sub-tropical humid
Tokyo, Japan
35° 50′ N., 139° 50′ E., Altitude 90 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall	2.0	2.6	4.3	5.3	5.9	6.3	5.6	4.6	7.5	7.2	4.6	2.3
Temperature	37	38	44	54	62	69	75	78	72	61	51	41

Answer the following questions:

1. Why are the rainy low latitude regions, with few exceptions, sparsely populated, and in a low state of civilization? How would the temperature and rainfall conditions influence man's physical and mental efficiency?
2. Why are the regions in the wet and low latitude climate the most

densely populated sections in the low latitudes? How long is the rainy season in Calcutta and in what season does it occur?

3. What are the causes for the large daily range of temperature on the low latitude desert of Aswan, Egypt? How do people adjust living conditions to this range?
4. What general statements can you make concerning the rainfall in the Mediterranean type of climate? the temperature?
5. What conclusions can you draw concerning the amount of seasonal distribution of rainfall in the sub-tropical humid region? temperature?
6. Determine the location of the world's greatest desert regions and explain why they occur in certain latitude belts or in special types of geographical regions.

Terms to be understood in connection with this unit:

weather
climate
troposphere
tropopause
stratosphere
stratopause
ionisphere
ionopause
barometer
low pressure area
high pressure area
isobars
isotherms
tropical
subtropical
humidity
relative humidity
absolute humidity
littorial
subpolar
marine type of climate
semi-arid
doldrums
contour
cyclones
anticyclones
norther
khamsin
simoon
sirocco
chinook
hurricane
monsoon
dew point
saturation
trade winds
westerlies
orographic
precipitation
convectional
horse latitudes
altimeter

UNIT III: POPULATION

For Course in Global Geography*

MARY VIOLA PHILLIPS
New Kensington, Pennsylvania, High School

I. OVERVIEW

Surface barriers have for centuries kept people apart but the air age has changed that. The lives of all people of the world are touched by the air.

Nothing on earth really matters except in terms of people. If we are to understand adequately human problems of the world we need to develop a better understanding of the world in terms of population pattern and the natural environmental facts that help to explain these distributions.

The study of the inter-relations of the pattern shown by maps will be an essential and vital part of this unit.

By means of maps, graphs and statistical tables the student will investigate the population density of the regions of the world and study the implications of differences in and distribution of natural features and resources.

II. Outline

A. Density of Population
- 1. Present World Population
- 2. Increase in Population Since 1800
  - a. Reasons for increase
- 3. Dense Population Areas of the World
  - a. Eastern Asia
  - b. India
  - c. Western Europe
  - d. Eastern United States
    - (1) Total number living in each area
    - (2) Total amount of land surface occupied
- 4. Areas which are Moderately Peopled
  - a. Rural United States
  - b. Parts of South America, Africa and Australia
  - c. Bordering the densely peopled areas of Europe and Asia
- 5. Sparsely Peopled Areas
  - a. Half world is sparsely peopled
- 6. Ten Leading Countries in Population
  - a. Areas and Population

* This course is offered in the high school, New Kensington, Pennsylvania. See JOURNAL for September and November, 1945, and 1946. Editor

B. Relation of Natural Features and Resources of the Earth to the Distribution of Population
  1. Influence of Climate on the Distribution of People
    a. Tropical lands
    b. Wet and dry tropical areas
    c. Dry lands—steppes—deserts
    d. Sub-tropical lands
    e. Humid Intermediate climatic areas
    f. Cold lands
      (1) Location of above climatic areas
      (2) Climatic conditions prevalent in densely peopled areas
      (3) Climatic conditions prevalent in sparsely peopled areas
  2. Influence of Land Forms, Soils and Water Resources on the Distribution of Population
    a. Land forms
      (1) Mountains—population and man's use of
      (2) Plateaus—population and man's use of
      (3) Hill lands—population and man's use of
      (4) Plains—population and man's use of
        (a) Land forms found in areas of dense population
        (b) Land forms found in areas of sparse population
    b. Soils in areas of dense population; sparse population
      (1) Kinds of soil
      (2) Conservation of soil
    c. Water resources in densely peopled and sparsely peopled areas
      (1) Amount of domestic supply
      (2) Number of rivers suitable for navigation
      (3) Waterpower
      (4) Proximity to sea—ocean and coastal margin
    d. Relation of mineral resources to distribution of population
      (1) Location of metal resources of world
      (2) Location of mineral fuels of the world
      (3) Minerals found in densely peopled areas

C. Uses Man has Made of the Earth's Resources in the Regions of Dense, Moderate and Sparse Population
  1. Development of Facilities for Interchange
    a. Amount of ocean shipping
    b. Uses of lakes, rivers and canals
    c. Roads and railroad development
    d. Development of air routes
  2. Man's Activities for Utilization of the Earth's Resources in Regions of Dense, Moderate and Sparse Population
    a. Areas of hunting and fishing
    b. Grazing areas
    c. Areas used for agriculture
    d. Lumbering
    e. Quarrying and mining
    f. Manufacturing
    g. Commercial activities

D. Space Relations of the Densely Populated Countries
  1. Area

2. Population
3. Location in latitude and longitude

E. Influence of Population on Nations
1. Races of Man
2. Advantages of a Large Population
a. Great nations originate in districts of dense population
(1) Power in numbers
3. Disadvantages of a Large Population
a. Element of weakness if people are not energetic, if land is poor or area is not industrially advanced

F. Coincidence and Divergence of Areal Distribution of Population Groups in Terms of Races, Religions, Languages and Nationalities.

G. Effect of Air Age on Our Frontiers of the Future
1. Areas of the World that Could be Frontiers of the Future
a. Location of areas
b. Characteristics
c. Natural wealth
d. Effect of airplane

III. Study Assignment Sheet

Unit III. (Laboratory Work)

Population

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1. On a map of the world show the population of countries by placing one dot for each million people.
2. Show population of countries on a polar projection map. What view does this give you concerning the concentration of population?
3. Superimpose a world population map on a physical map. What natural features are predominant in areas of dense population? In areas of sparse population?
4. What is the present world population?

5. Select five countries having the largest population density from each of the continents of the world and give their area in square miles and their population.
6. What four regions of the world contain the most people?
7. In general are the densely populated regions near to the sea or far from it?
8. In what hemisphere are the more densely peopled areas located?
9. Name ten countries which include large areas of moderate population.
10. What is the name of the large sparsely peopled area in northern Africa? Why has this area but few people?
11. Make a chart for the following densely populated areas of the world—(1) Eastern Asia (2) India (3) Western Europe (4) Eastern United States.
    Show—winter surface temperatures
    summer surface temperatures
    winter rainfall
    summer rainfall
    a. What wind belts do they lie within?
    b. What ocean currents influence their climate?
12. Study a physical map of the world and answer the following questions:
    a. Where are the major mountain areas of the world located? the largest areas of hills? the largest areas of plateaus? the largest areas of plains?
    b. What ocean has the most mountainous shoreline?
    c. What kind of a shore line does the Atlantic Ocean have? the Indian Ocean?
13. Compare the physical map with the population map and answer the following questions:
    a. On what kind of land surface do most of the people of the world live?
    b. On what kind of land surface will you find the fewest people living?
14. Select the five largest countries of the world and make a chart showing:
    a. Area and population
    b. Land forms
    c. Range of latitude

d. Range of longitude
e. Chief crops
f. Chief minerals
g. Chief imports
h. Chief exports

15. Study maps showing the world distribution of metals. List in order of importance three countries which have—
    a. ________________ ________________ ________________
    Areas with largest resources of iron
    b. ________________ ________________ ________________
    Areas with largest resources of copper
    c. ________________ ________________ ________________
    Areas with largest resources of tin
    d. ________________ ________________ ________________
    Areas with largest resources of bauxite
    e. ________________ ________________ ________________
    Areas with largest resources of nickel
    f. ________________ ________________ ________________
    Areas with largest resources of manganese
    g. ________________ ________________ ________________
    Areas with largest resources of tungsten

16. Study maps showing the world distribution of mineral fuel.
    a. Name ten countries which lead in the production of coal. List them in the order of their importance.
    b. Name ten countries which lead in the production of petroleum. List them in the order of their importance.
    c. What areas of dense population are distinguished for their production of mineral fuels? for their manufacturing?
    d. From this investigation what opinions have you formed as to the relationship between dense population and a high production of minerals? a highly developed manufacture?

17. Compare the map of principal occupations of the world with a world population map and answer the following questions:
    a. What type of activity supports the greatest number of people per square mile?
    b. What type of activity supports the least number of people per square mile?
    c. What activity covers the greatest space on the surface of the earth?
    d. What activity covers the least space on the surface of the earth?

18. Show the space relationship of the continents in the chart below

Continents	Area	Population	Range of Latitude	Range of Longitude
North America				
South America				
Europe				
Asia				
Africa				
Australia				
Antarctica				

19. Name the continents which contain—
    a. The largest amount of densely populated area
    b. The smallest amount of densely populated area
    c. The largest amount of sparsely populated area
    d. The smallest amount of sparsely populated area
20. Make a study of maps and statistics and list the continents having
    a. Greatest railroad development
    b. Largest areas essentially unused
    c. Areas of extensive grain production
    d. Greatest water power resources
    e. Largest number of automotive vehicles
    f. Largest areas of coniferous forests
    g. Largest areas of deciduous forests
    h. Greatest industrial development
21. How do the middle latitude regions of the Southern Hemisphere compare with one another in their ability to support population? Form an opinion on this question by investigating population densities of the following principal middle latitude countries of the Southern Hemisphere. Make a general survey of their resources.

Countries	Area	Population	Resources
Argentina			
Chile			
Uruguay			
Union of South Africa			
Australia			
New Zealand			

22. Study a population map of United States—
    a. Compute the density of the individual states
    b. Compare the land forms with the various averages
    c. Compare the activities with the various averages
    d. In what part of the United States do most of the people live? Why?
23. Make a world map showing the races of man. What race predominates in North America, South America, Europe, Asia, Africa and Australia?
24. Name ten large cities of the world that are centers of most densely populated areas.
25. Study a world map showing the ocean trade routes. Why does trade take place largely between the densely populated areas of the world?
26. Select a country or area of the world which seems to hold some promise for future development and investigate its natural resources: climate, topography, soils, natural waterways, minerals, forests and grasslands.
    a. Set forth your reasons for believing the country will grow in importance.
    b. What activities could be carried on?
    c. How could it supply any deficiencies and overcome handicaps?
    d. What effect will the development of airpower have on population density of regions heretofore considered of little value?

UNIT IV. THE PACIFIC AND ITS ISLANDS FOR COURSE IN GLOBAL GEOGRAPHY*

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I. OVERVIEW

The international situation of the last few years has caused the interest of many students to turn to the Pacific. They have become island conscious. To most of them this area is very remote.

This unit covers the physical setting, natural and cultural condi-

* This course is offered in the high school, New Kensington, Pennsylvania. See JOURNAL for September, November, 1945, March and April, 1946. Editor.

tions, economic responses, and international relationships of areas the students selected.

In post war diplomacy the United States has strategic interests in certain Pacific Islands. If we are to remain a world power we must know and control the Pacific. Furthermore, we no longer can visualize the Pacific in terms of naval power alone but must recognize definite changes in its geography, brought about by air power.

The work set forth in this unit will help the student to become better acquainted with the Pacific ocean and its islands, their value and their role in international strategy.

II. The Outline

A. The United States in the Pacific
  1. Yankee Whalers in Oceania between 1791-1828
    a. Islands discovered
    b. Uses made of islands
  2. United States Exploring Expedition 1836
    a. Reasons for expedition
    b. Results of expedition
  3. Guana and the Act of 1856
    a. Demand for fertilizer
    b. Need of protection
    c. Results of Act
  4. Pacific Cables
    a. Islands that gained new significance
  5. Recent Developments in Oceania
    a. Washington Conference of 1921 and Naval Treaty 1922
      (1) Provisions made
    b. Scientific tours of 1924
      (1) Results
    c. 1937—Widespread search for ill-fated aviatrix, Amelia Earhart
  6. The Law of Nations
    a. Need for actual occupation
    b. 1935—groups staked tenable claims and took possession of certain islands in Pacific
  7. Present Activities of United States in the Pacific
    a. Aiding unification in China without becoming involved in civil war
    b. Sharing occupation duties with Russia in Korea
    c. Acting for Allies in control program in Japan
    d. Strategic interests in certain islands of Pacific
    e. Preparing to grant full independence to Philippines

B. Physical Environment of the Pacific
  1. Size—Volume—Distance
    a. Amount of earth's surface it comprises
    b. Size compared with Atlantic Ocean and Indian Ocean
    c. Area of Pacific—Depth of Pacific
    d. Distances—north to south from Bering Strait to Antarctic Circle—east to west along Equator

2. Relief of the Pacific Basin
   a. Divisions
      (1) Western—continental borders and associated islands around Asia and Australia—characteristics
      (2) Eastern—true Pacific depression and Oceanic Islands—characteristics
   b. Deeps of the Pacific
      (1) Meaning of deeps
      (2) Location of deeps
      (3) Causes of deeps
      (4) Name of deeps
      (5) Human significance—laying of cables, submarine activity
3. Topography of Lands Bordering Pacific Ocean
   a. Extent of mountains and plains in the continents touching the Pacific
   b. Compare with topography of lands bordering Atlantic

C. Climates and Currents of the Pacific
   1. Location, direction of flow and influence on climate of each
      a. North Equatorial Current
      b. Kuro Siwo or Japanese Current
      c. Okhotsk Current
      d. West Wind Drift
      e. California Current
      f. North Equatorial Current
      g. South Equatorial Current
      h. Counter Equatorial Current
      i. East Australian Current
      j. Humbolt-Peruvian Current
   2. Summer and winter effects of currents
   3. Location of high and low pressure areas in summer and in winter

D. Influence of Ocean Currents on the Productivity of the Sea
   1. Relation between ocean currents and life in ocean
      a. Kinds of life found where intensive mixing of cold and warm currents takes place
      b. Kinds of life found where we do not have waters of contrasting temperatures

E. Soils of the Pacific Area
   1. Lands Bordering the Pacific
   2. Islands of Pacific
      a. Continental
      b. Volcanic
      c. Coralline

F. Migration of Races into the Islands of the Pacific
   1. Origin and kind
   2. Paths of Migration
   3. Outstanding Characteristics of Each Race

G. Main Groups of People in the Pacific Area
   1. Native Groups
   2. Colonizing Nations

H. Island Groups of the Pacific
   1. Name of Groups—Melanesia, Micronesia and Polynesia
      a. Name of islands included in each group
   2. Location of Each Group

a. Range of latitude and longitude
b. Climatic region
c. In respect to land bodies
3. Characteristics of each group and reasons for these characteristics
a. Winds—when, kind, why?
b. Rainfall—distribution by seasons, effect of rainfall
c. Storms—kind, time of occurrence and effect
d. Temperature conditions—daily and seasonal range, effect of temperatures
4. Vegetation—natural and cultivated
5. Animal life—native and domesticated
6. Physical features and composition of soils
7. Natural Resources
8. Population—origin, health of natives, distribution
a. Development—homes, food, clothing, tools, transportation facilities, industries, religion, government, etc.
b. Types of people coming into islands and reason for coming
c. Result of contacts with outside world
9. Economic Possibilities—present and possible commercial products
10. Problems of Development

I. America's Pacific Islands
1. Name and Location of Islands
2. Previous Political Allegiance and How Ownership with United States was Established
3. Extent of Development in Past; in Future
4. Problems Facing United States in the Development of Its Pacific Islands
5. Hawaiian Islands
a. Location of the climatic region
b. Locational geography with respect to United States, world powers and world markets
c. Area, extent and physical characteristics
d. The people—races, languages, religions and educational status, occupations developed—agricultural lands, chief crops (pineapples, sugar), export products, development of manufacturing
e. Transportation—development of roads and railway systems, intercommunication between harbors, naval and air bases
f. Future importance and development

J. The Future of the Pacific
1. Effect of the "Air Age" in the Development of Pacific Islands
2. Problems
a. Need for recharting coastal areas
b. Research in respect to temperature, tides, deeps, currents, etc.

III. Study Assignment Sheet

Unit IV (Laboratory Work)

The Pacific Ocean and Its Islands

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February, 1944, Easter Island
August, 1944, New Hebrides
January, 1945, Our Global Ocean

The Pacific Ocean

1. List the earliest activities of the United States in the Pacific. What were the results of these activities?
2. List the recent activities of the United States in the Pacific. What were the results of these activities?
3. On an outline map of the Pacific area locate and name the warm and cold currents of the Pacific. Show direction of flow by means of arrows.
4. Locate and name the deeps of the Pacific on above map. Draw in the surface features of each continent bordering the Pacific.

5. On a map of the world show how the great pressure belts of the world are arranged in January; in July.
6. How large is the Pacific? Compare with land masses of the world; with waterbodies. Give distance from Bering Strait to Antarctic Circle; from East to West at equator.
7. Why is a knowledge of oceanic and atmospheric circulations of the Pacific important to us?
8. In what way is animal life in the ocean related to the ocean currents? Show the great fishing areas on a map of the world.
9. Make a map showing the tides of war in the Pacific 1941-1945. Show Japanese position prior to Dec. 7, 1941. Show Japanese position Dec. 7 to Jan. 1942. Show Japanese position Jan. 1942 to Aug. 1942. Draw colored line showing status Mar. 1, 1944, Mar. 1, 1945 and Aug. 14, 1945. (*New York Times,* Dec. 2, 1945)

Islands of the Pacific

1. On an outline map of the Pacific Ocean show the approximate location of the following island groups—Melanesia, Micronesia and Polynesia. Locate and name the islands included in each group.
2. Give the range of latitude and the range of longitude for the three large groups.
3. In what wind belt or belts are each group located? What latitudes or zones?
4. Select one island from each group and make a thoro study of it. Give the following information for the islands of your choice:

a. Name of Island ——————————

Location ....
Climate ....
Land Surface ....
Natural Resources ....
Chief Activities ....

b. Name of Island ——————————

Location ....
Climate ....
Land Surface ....
Natural Resources ....

Chief Activities ....

c. Name of Island ——————————

Location ....
Climate ....
Land Surface ....
Natural Resources ....
Chief Activities ....

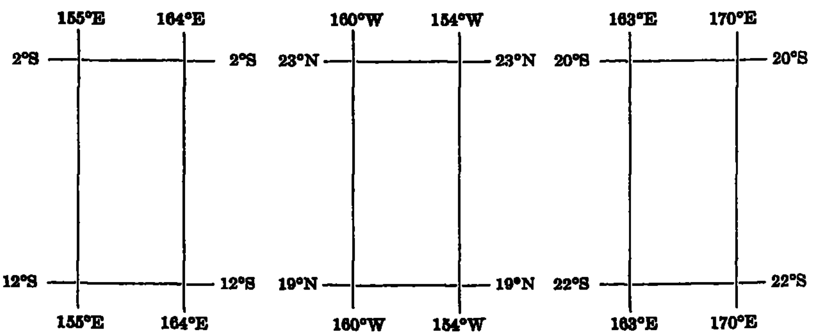
5. In general the Pacific Islands are of three types as regards origin. Classify the following islands under the proper headings: New Britain, Canton Island, Easter Island, Juan Fernandez, Marshalls, Tongo, Galapagos, New Ireland, New Hebrides, New Caledonia, Eniwetok, Gilberts, New Guinea, Hawaiian, Marquesas, Ellice, Samoa, Tahiti, New Zealand, Philippines, Palmyra.

Continental	Volcanic	Coralline
1.		
2.		
3.		
4.		
5.		
6.		
7.		

6. Give the outstanding characteristics and composition of islands that are continental, volcanic and coralline in origin.
7. In what island groups are the following islands located: Melanesia, Micronesia or Polynesia? Give approximate location.

Island	Group	Latitude	Longitude
Caroline			
New Britain			
Marshall			
Hawaiian			
New Guinea (Papua)			
Phoenix			
Gilbert			
Marquesas			
New Caledonia			
Cook			
Palau			
Society			
Loyalty			
Samoa			
Fiji			
Tuamotu			
Friendly			
New Hebrides			
New Ireland			

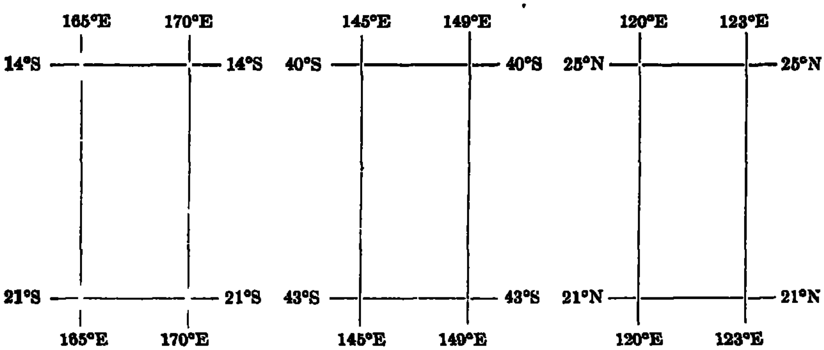
8. Locate, sketch in, and name the Pacific Islands indicated by the parallels and meridians below.



9. Give the island location of each of the following cities that are of importance as seaports and commercial centers of the mid-Pacific: Honolulu, Pearl Harbor, Hilo, Noumea, Suva, Papette and Apia.

10. On a map of the Pacific draw in the routes of the Air Transport Command as of September 1945. (Newsmap)
11. Give the distance in great circle statute miles between the places listed below:

Cities and Islands	Great Circle Statute Miles
San Francisco to Honolulu	....
San Francisco to Kwajalein	....
San Francisco to New Caledonia	....
Honolulu to Christmas Island	....
Honolulu to Midway	....
Honolulu to Brisbane	....
Guam to Tokyo	....
Guam to Manila	....
Brisbane to Leyte	....
Attu to Tokyo	....



America's Pacific Isles

1. List America's Pacific Isles from the Aleutians to Samoa. What uses have been made of these islands?
2. What islands are the stepping stones between the Hawaiian and the Philippines?
3. What are some of the present and possible commercial products from our islands in the Pacific?
4. On a map of the Hawaiian Islands locate the following: Hawaii, Maui, Lanai, Molokai, Kahoolawe, Oahu, Kariai, Niihau, Hilo, Honolulu, Pearl Harbor, Lehua, Kilanea, Ka Lae, Halawa, Hana, Kauai Channel, Kaiwi Channel, Alenuhaha Channel.

5. On a map sketch the route followed by the Japanese in their "Operation Order No. 1." Show route of Japanese Task Force to Pearl Harbor and return from Pearl Harbor to Tokyo. (*New York Times,* Dec. 2, 1945)
6. Discuss origin and growth of American ownership in the Pacific.
7. Give facts to prove the following statement is true—"the United States becomes a Pacific Nation."
8. Why is there a greater need for more research and exploration in the Pacific?

Terms to Identify

eddies	buffer
currents	strategic
deeps	coralline
reefs	doldrum
atoll	sedimentary
fungi	copra
impenetrable	sustenance
capita	fissures
lagoon	guana
archipelago	typhoon
arcuate	hurricane
tides	turbulence

Other Activities

1. On one of the maps you have made show the time zones of the Pacific.
2. List the islands of the Pacific that you have had friends or relatives stationed on.
3. Bring in articles from newspapers and magazines which are related to the Pacific. Paste in your notebooks the best newspaper maps you can find.
4. Bring in souvenirs that you have obtained from the Pacific area and show them to other members of the class.

UNIT V. JAPAN

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I. OVERVIEW

Japan is much in the eyes of the world at present. No adequate understanding of Japan and the social, political and economic changes that are taking place within the country is possible without a consideration of its geography. The location, climate, natural resources and their distribution, stages of industrial development, habits, religion and customs of the people are basic understandings, prerequisite to an intelligent appreciation and interpretation of and to attempted solution of its national and international problems.

This detailed study of the country will furnish the students with geographic facts which can be used as an aid in understanding and interpreting past and present events. They will be better able to analyze current problems in Japan and arrive at conclusions that are sound.

II. OUTLINE

A. Location—Geographical Significance
- 1. Range of latitude and longitude
  - a. Compared with British Isles
  - b. Compared with United States
- 2. Location in respect to Pacific Ocean
  - a. Influence of insular position
    - (1) In past military activities
    - (2) On people and ideas
    - (3) On development of industries
- 3. Location in respect to the continent of Asia
  - a. Influence of three land areas of the continent which project toward Japan
  - b. Japan's position in respect to Asia compared with England's position in respect to Europe—desire for buffer states
- 4. Location in respect to the United States
  - a. In terms of naval power
  - b. In terms of air power

B. Physical Framework of the Country
- 1. Plains—Kwanto, Mino Owari, Ishihari, Echigo
- 2. Mountains—Two-thirds of land area
- 3. Alluvial valleys
- 4. Volcanic and Seismic Activity
- 5. Nature of Coastline

C. Climate—Type of
- 1. Factors controlling the type of climate
  - a. Monsoon
  - b. Latitudinal position
  - c. Surrounding waters
  - d. Ocean currents

2. Violent winds—typhoons—frequency

D. The Native Vegetation
   1. Abundant rainfall, varied relief and great latitudinal extent reflects a luxuriant and diversified vegetation
      a. Sakhalin—vast forest areas of conifers
      b. Hokkaido—deciduous broad leaves and conifers
      c. Honshu—northern in character—deciduous and evergreen intermixed
      d. Shikoku and Kyushu—semi-tropical and few tropical, bamboo forests widespread in lowlands

E. Population—Density of
   1. Ethnic mixture of Korean, Ainu, and Malayan stock—personal characteristics
   2. Religion of people and philosophy of life
      a. Effect of religion of people
      b. Effect of religion on rest of world
   3. Types of homes—attitude toward home and family
   4. Educational system—attitude toward learning
   5. Inventiveness—proof of this
   6. Social customs

F. Rapid Development to Dominant Power
   1. Natural conditions which assisted the people in this restricted area to win and hold a place as a world power
   2. Changes brought about by spread of western ideas
   3. Major problems brought on by rapid development

G. Natural Conditions which Favored Japan's Development Industrially and Commercially
   1. Power resources and access to resources
   2. Location favorable for world trade
   3. Labor supply and capital—climate favorable for regular and sustained labor
   4. Transportation facilities
   5. Favorable coastline

H. Types of Manufacturing Industries Japan had Developed before World War II
   1. Textile industries—silk, cotton, rayon
      a. Source of raw materials
      b. Centers of manufacture
      c. Amount exported
      d. Reason for rapid development
   2. Iron and steel industry
      a. Source of iron ore
      b. Iron and steel centers
      c. Reasons for desire to develop iron and steel industry
   3. Shipbuilding
      a. Need of ships
      b. Source of materials
      c. Shipbuilding centers
   4. Manufacture of paper
      a. Raw materials
      b. Water resources
      c. Importance of

I. Agriculture Development
   1. Conditions favorable to agriculture
   2. Conditions unfavorable—how overcome
   3. Leading crops
   4. Self sufficient in 1937—Steady decrease after outbreak of war

J. Fishing Industry
   1. Natural conditions favoring industry
   2. Conditions on land which forced Japanese to fishing
   3. Kind of fish caught
   4. How fishing industry helped the Japanese in preparation for war

K. Japan's Industries Today
   1. Changes brought about by war
   2. Deterioration in the position of Japan as a world power
   3. Future possibilities

L. Japanese Aggression
   1. Reasons for Japan's desire for more territory
      a. Problem of overpopulation
      b. Need of raw materials
      c. Need of markets
      d. Belief that all Asiatics should be united under one political leadership
      e. Possession of lands considered essential to defense
      f. Desire for complete economic and political control over the source of raw materials that made its industries possible
   2. History of empire acquired between 1875 and 1942
      a. Kurile Islands, Bonin and Ryukyu Islands
         (1) When and how secured
         (2) Location and description of islands
         (3) Valuable fishing grounds
         (4) Increased arc of Japanese naval control of western Pacific
      b. Taiwan (Formosa)
         (1) When and how secured
         (2) Description of land, its resources and its people
         (3) Products and industries
         (4) Development carried on by Japan
         (5) Rich source of tropical raw materials
         (6) Excellent base
      c. Kwantung Peninsula in Southern Manchuria
         (1) When and how secured
         (2) Value
      d. Korea (Chosen)
         (1) When secured by Japan
         (2) Location created desire for buffer state
         (3) Conditions in Korea that made possible Japan taking control
         (4) Attitude of Koreans toward Japan
         (5) Koreans—homes, customs
         (6) Agricultural and mineral resources
         (7) Ice free harbors
         (8) Activities of Japan in Korea
         (9) Changes brought about by the war
      e. Micronesia (Marianas, Marshalls, and Carolines)
         (1) When and how secured
         (2) Importance of location
         (2) Area covered
         (4) Resources
         (5) Development carried on by Japan
         (6) Means of extending naval control over the whole of western Pacific Ocean
      f. District of Tsingtav
         (1) When secured

(2) Valuable location for striking at heart of China

g. Manchuria

(1) When and how secured

(2) Location in respect to Japan

(3) Description of surface

(4) Climatic conditions prevailing

(5) Products and natural resources

(6) Population—Chinese immigration

(7) Activities of Japanese

h. Other conquests

(1) Annexed Hainan and other islands of strategic importance in 1939

(2) Indo-China and Thailand by summer of 1941

(3) By summer of 1942 the Philippines had been wrested from United States, Malay Peninsula and Burma from British and East Indies from Dutch

M. Japanese Aggression Ended

1. Defeat of Japan
2. Reduced to status of minor power

N. Future Problems

1. Adjustment to geographical surroundings in a limited area
2. Economic and political reorganization
3. Reshape the nation into one that will not be a threat to peace in the future

III. STUDY ASSIGNMENT SHEET

Unit V (Laboratory Work)

Japan

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1. Make a political map of present day Japan, a relief map, an annual rainfall map, and one showing the former chief industrial districts. Describe the physical framework of Japan.
2. Between what two ranges of latitude does Japan extend? longitude? Compare the range of latitude with United States. How does Japan resemble Great Britain in location? What are the advantages of Japan's insular position? the disadvantages?
3. Make a map showing the area controlled by Japan in 1942. Shade in a distinctive way the region captured after Pearl Harbor.
4. What are the names of the four principal islands? What island did Japan share with Russia? What is the area of present day Japan?
5. On a map of North America draw a map of east coast and use its exact range of latitude. At this latitude what type of climatic conditions would you find in northern Japan? central Japan? southern Japan?
6. Make a climatic graph showing the average monthly temperature and precipitation for the two stations which are described below.

Tokyo, Japan
35°50′ N., 139°50′ E., Altitude 90 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall	2.0	2.6	4.3	5.3	5.9	6.3	5.6	4.6	7.5	7.2	4.6	2.3
Temperature	37	38	44	54	62	69	75	78	72	61	51	41

Charleston, South Carolina, U.S.A.
32°47′ N., 79°56′ W., Altitude 48 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall	3.1	3.1	3.3	2.4	3.4	5.3	6.2	6.7	5.2	3.9	2.7	3.3
Temperature	49	52	57	64	72	79	81	80	65	67	58	51

7. What general statements can you make concerning the rainfall in Tokyo as compared with Charleston, South Carolina?
8. How would you characterize the summer temperature of both? The winter temperature?
9. What ocean currents influence the climate of Japan? What other factors influence the climate of Japan?
10. Under what social conditions did and do most of the people live? What is the state religion? What are the outstanding doctrines of their religion? What probably will be the effects of our occupation of Japan upon their social customs and conditions? Study the papers and list the reforms and changes that are taking place in Japan today.
11. What are the distinctive features of Japanese agriculture? What conditions are favorable? unfavorable? What are the chief crops? What are the causes for the lack of livestock? How is it possible for a densely settled country like Japan to supply nearly all its own food?
12. What natural factors have aided in the great importance of fisheries? Where could their fishing vessels be found? Why is Japan's diet so largely limited to rice and fish?
13. What natural conditions favored Japan's development industrially and commercially? What types of the manufacturing industry did Japan develop? What materials were bought to supply its industrial centers and from what countries of the world? What

conditions made it possible for people of Japan to work for comparatively low wages? Where did Japan get the minerals to produce its war materials?

14. When did Japan open its doors to world trade? How did Japan rank in the commercial world? What were five of its leading imports? exports? What are its future possibilities?
15. Why was Japan able to rise from an isolated unknown nation to the rank of a first-class power? List the methods Japan used to modernize itself.
16. What are three things a nation can do when it becomes over-populated? Which line of action did Japan follow?
17. Discuss Japan's mainland policy. What did Japan gain from wars with China and Russia?
18. In the chart below list the areas Japan acquired between 1875 and 1942. Tell when and how they were acquired. List the chief resources of each area.

Areas	When	How	Resources Gained

19. Why did Japan assume control of Korea? Why was Taiwan a valuable colony?
20. Why were the Japanese anxious to gain and retain control of Manchuria?
21. What sections of China proper did Japan gain control of? Why?
22. What Pacific islands were given to Japan as mandates after World War I?
23. Summarize how Japan's colonies and dependencies were important factors to it as a world power.
24. What geographical patterns of expansion did Japan follow before the coming of the age of air power? What ideas for expansion did Japan follow after becoming aware of air power?
25. Draw a map showing the Japanese geography of the Pacific based upon air power.
26. Find the great circle air line distances between Tokyo and the following cities of the world. What time would it be in each city if it were 2 A.M. in Tokyo?

Cities	Distance	Time
New York		
Chicago		
Chungking		
Manila		
Calcutta		
Moscow		
Cairo		
Honolulu		
London		
Singapore		
San Francisco		
Mexico City		
Sydney		
Panama		
Juneau		

27. What are the strategic points lying directly between United States and Japan in the Pacific?
28. Show that issues and situations that have caused most of our wars are geographical.

Terms to identify

acquisition
aggression
atoll
commodity
concentric
deeps
geopolitical
humid subtropical
humid continental
imperialistic
insular
lagoon
leeward
low altitude
mainland policy
mandated
marginal
middle latitudes
monopoly
monsoon
Occidental
Oriental
seismic
Shintoism
strategic
subsistence
Taiwan
typhoon

Other Activities

1. Make a collection of newspaper clippings, maps and current topics showing the activities of the United States in Japan.
2. Prepare a written report on "The Activities of the Japanese in South America."

PART FIVE

POLITICAL GEOGRAPHY

What is political geography? Most people think of political geography only in terms of national boundaries. One definition states that political geography is: "an integrated study of the major problems of the nations of today in the light of environmental, historical, and economic factors." Thus defined, political geography should be a valuable course in the education of high school students.

The two World Wars have forced the people of the United States to realize that our existence as a nation and also the continuance of our way of living depend upon our understanding the nations of the world. America's foreign policy and consequently foreign relations rest, in the final analysis, upon the intelligence and common sense of the mass of our citizens. Our high schools give most of our citizens their final training before they become immersed in the details of making a living. This training should include the opportunity to examine international and national problems in their geographical as well as their historical setting. Only a citizenry thus trained is able to consider the present complex and varied international problems with some degree of fairness and assurance. The average adult of today has a feeling of inadequacy and tends to make hasty decisions on international questions simply because he lacks the necessary background to analyze the claims and statements made by various political groups.

The centers of interest in a course in political geography should change from year to year with the change in dominating political problems. However, the basic elements to be considered should remain the same. Every phase of geography should be called upon to contribute its part in the understanding of each problem. The various articles in this section do not set up a course of study but supply materials and suggestions for teachers. Although all the articles were written before World War II the material and suggestions are valuable today; for example, the Balkans are an international problem today as they have been for several centuries.

POLITICAL GEOGRAPHY IN THE HIGH SCHOOL

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The actions and aspirations of nations are among the most common subjects of conversation at nearly all social gatherings whether at men's discussion groups, church parties, or formal dinners. By common consent we recognize nations as political entities; concerning them we have an individual and universal curiosity. Is it not strange that in our high school and college curricula we spend years studying the past, studying the activities of peoples and countries that have long ago disappeared from the face of the earth, but only rarely do we bring these studies into the realm of the present? Political geography, whether known by that name or by some other, should be an integrated study of the major problems of the nations of today in the light of environmental, historical, and economic factors. To develop an orienting acquaintance with the frame work of the political structure of the modern world should be a primary objective of such study.

FUNCTION OF POLITICAL GEOGRAPHY

Interpreted as the geography of nations, political geography at the high school level would differ from the geography taught earlier in that it would recognize nations as entities, and thus it would focus attention upon the activities of the nations rather than upon the activities of the individuals which comprise them. Such a course would assist pupils to develop an appreciation of the world today and to evaluate better the outlook for developments in the world tomorrow. Taking full advantage of all the history that had previously been taught, of the industrial and commercial geography which at least some of the pupils would have had, the course in political geography would serve to integrate the various disciplines of the past and to cement them into an effective tool for probing the future. In general the related studies which should precede political geography and which, in most cases will precede it if given in the high school, include: (1) general world geography, taught more or less effectively in the grades; (2) commercial and industrial geography, given in many junior high schools; (3) extended and repeated studies in history carried in the grades and in the junior high school with a generous share of the total program in each case; and (4) civics, taught in some form quite generally for at least one

semester in the junior high school. Upon such a base a course in political geography could be organized either to fit a situation where it would be the capping climax of three years of consecutive and well ordered study, or to fit into a sequence which would involve no high school prerequisites.

If I were king, I would set up a program which would include the teaching of geography in every year of the senior high school, on a basis of at least three periods a week. Recognizing, however, that such a program cannot be achieved in the near future, except perhaps in a few fortunate instances, and believing in a pragmatic philosophy, let me suggest that political geography can parallel world history and it may precede modern history. In either case it will have real value. Therefore, political geography designed as previously stated, can be handled well in any year of the senior high school. I believe that this view conforms to the previous findings and recommendations of committees of the National Council of Geography Teachers. Six years ago a distinguished committee made a report which was accepted and published—a report which has had wide circulation. Yet the fact remains that the course recommended has been adopted in but few places.

In the 1929 report of the Committee on High School Geography, the objectives of political geography were ably presented—objectives with which I believe there is general agreement. Of the various ones stated I think a few should be given particular emphasis. Among the ultimate objectives should be: (1) the ability to carry into after-school life the habit of wide and diversified reading and study of world affairs as a form of cultural development, and (2) the ability to participate in the more formal discussions of matters of current interest as an enjoyable and useful spare-time occupation. Among the specific objectives which geography in particular should strive to attain are: (1) Ability to appreciate that most of the great international problems of the present day are rooted in geographic conditions. Many of these problems are world-wide in their scope and require a knowledge of world conditions for their solution. (2) Ability to discover the geographic information to be found in maps, pictures, grafs, statistical tables and current literature; and to use all the various library helps such as bibliographies, indexes, readers' guides, and others in finding facts and materials wanted.

The question arises at the outset as to what various sequences and procedures might be utilized in order to attain these objectives. Undoubtedly in the hands of competent teachers different routes

might safely be followed. Let us bear in mind however that most teachers called upon to present the course mentioned would be untrained, and therefore they would lack any broad technical foundations of their own upon which to build. This applies not only to active schoolroom teachers, but also to principals and superintendents who have supervisory duties. Consequently, if a course is to meet with any considerable degree of favor it will have to be set up so as to convince those in executive positions in the schools that it is vital in the development of citizenship, and preferable to some line of work now being given.

IMPORTANCE OF SEQUENCE

In order to arouse the interest referred to, a fresh point of view must be injected into the game. We have been rooted to past procedures so long that orthodoxy in this respect, in spite of its failure to attain results, has taken on the halo of virtue. Literally we have come to think that all geography courses must have as their central point of departure the home state or the home country—for most of us, the good old United States of America. With some the Fatherland offers the only desirable point of departure and for them, Europe, particularly northwest Europe, has come to hold the dignified position of queen (if not that of king!) in the realm of geographical royalty.

Why not be bold, for this is a time when even sedate judges warn us that "Minds must be bold if progress is to be maintained." Regardless of temporary disturbances across the Atlantic the world is coming to look with more and more concern upon political developments west of the Pacific. The Orient is now the center of interest and the prospects are that it will continue to be of increasing importance in world affairs. Therefore, in the course that I believe should be introduced, Part I would deal with the countries of the Far East.

First, I would consider Japan, because it now occupies the limelight in that section of the world. The attention focused upon it as a political entity engenders feelings toward it quite apart from any feeling toward the Japanese as people. In other words, Japan is functioning so definitely as a political unit that we forget the existence of individual Japanese. And yet, behind the policies and activities of the nation lie the tremendous factors of great density of population, scarcity of land, and dearth of fundamental resources. To these must be added the human factors almost equally powerful, those of race, religion, and a recently awakened spirit of

intense nationalism. Surely, Japan as a starting point would lack no appeal to interest, to imagination, or to reason in the consideration of the problems which confront it and with which it faces the world.

Next I would consider China—a huge giant, vast in extent, rich in resources, numerous in population, and fortunate in the industrious qualities and in the sagacity of the individual Chinese; unfortunate, however, in the lack of integration of its several huge parts—a giant, whose mechanism is out of gear and for whom the future is indeed a question. Will that giant thru sheer strength be able to develop the integration and cohesiveness necessary for natural unity and functioning? In the biological world of geologic ages past, great size has proved time and again to be a fatal handicap. The giants of the earth have disappeared and their bones are now being disinterred by curious, but intelligent, beings whose physical stature is pygmy-like in comparison. Will the great size of China prove to be a fatal handicap, or will the Chinese gradually develop the connecting tissues necessary to the functioning of the nation? The future of the country will depend upon the way these questions will be answered. Thus, from the standpoint of challenging attention, huge China will form a logical second to little Japan.

As the third member in this introductory group I would place Netherland India, an island empire peopled by industrious natives of varying degrees of culture and ruled by stolid, ambitious and energetic Dutchmen. Among colonial empires we hear but little concerning difficulties in the Dutch East Indies. There lie the principal foreign possessions of the Netherlands, islands whose people seem to be content and industrious, and whose connections with the imperial country is so firm that the great nations of the world seem to be raising no question as to the permanency of the Dutch sovereignty. Thus Netherland India is presented as a connecting link between the Far East and the nearer East. It will provide the variety needed to stimulate interest because of its sharp contrasts to the countries studied before, and it will furnish a logical introduction to the western portion of the vast continent of Eurasia.

CONTRASTS IN EUROPE

As Part II of this social study I would suggest that the route of trade be followed—the route which joins the Far East with western Europe. I would present next the so-called small nations, the stable, conservative, and well ordered countries of northwest Europe. In this study the political entities of the Scandinavian

lands should receive principal attention; their geographical setting should be developed; their paucity of resources considered, and their progressive social institutions emphasized. The historical factors should be brought out clearly because therein lies the explanation for much of their present social and economic outlook. Long ago, these countries learned the futility of war. As nations they are of peculiar interest to all the world because they covet no additional territory, they indulge in no dreams of conquest, either for land or for mineral wealth, and therefore the attention of their inhabitants focuses upon the constructive arts of peace.

Next should come a résumé study of Central Europe, the area wherein the heat engendered by huge populations pressing one upon the other has repeatedly burst into flame. There the problems of limited resources, densely populated lands, diverse racial groups, and long standing national hatreds must be given thoughtful consideration. Are the problems aroused by such conditions unsolvable? Can those peoples develop the tolerance necessary for living together in intimate contacts? Is it a case where ultimate peace must depend upon the creation of a real league of nations, or of a superstate equipped with police power adequate to enforce its mandates?

In the third section of Part II, I would present the Mediterranean lands. In this should be recognized the factors from which much of our modern civilization has sprung. In the Mediterranean area lies Egypt, the seat of one of the most ancient cultures; there are the inflammable Balkans and the peninsula where once blossomed the glory that was Greece; there is the Iberian Peninsula, once ruler of most of the western world; and there lies peninsular Italy the seat of the Rome that was, and the Rome which now again looms large. It seems clear that the study of the Mediterranean lands from the broad viewpoint of physical, historical, economic and social factors furnishes the most effective link whereby the past may definitely be connected with the present; whereby contrasts can be shown between the small countries and the large; between those without colonial ambitions and those dominated by such ambitions. Therefore, the Mediterranean lands can be made to serve the double function of introducing the problem attendant upon the great empires of today and of connecting smoothly and logically the study of the eastern world with that of the western world.

THE GREAT EMPIRES

Part III should be a study of the great modern empires of the old world. Among the first to be considered should be the Italian

possessions in Africa—where they are, what they are, their resources and the reasons back of Italy's evident dissatisfaction with the present distribution of territorial rights.

I would turn next to France. Like Italy, France is an empire with a relatively small home country and large territorial possessions. What are the peculiar problems and conditions which confront it not only as a nation in Europe but also as one of the world's great empires? Here the relationship of France as a political entity to that of Germany must be emphasized. How important are the differences in population when viewed from the standpoint of the nation? Has the colonial empire thus far proved to be an asset either economically or politically to the France in Europe? To what extent do colonial interests affect the national consciousness of the country?

From France we are led readily and naturally to a consideration of the two great remaining powers whose headquarters are in Europe, namely, the British Empire and the Union of the Socialist Soviet Republics. These two great dominions, each quite truly a federation of nations, differ sharply not only in their geographical conditions but also in their historical and political backgrounds. As regards contiguous territory, Russia is the world's giant nation. As a political entity Russia should be studied from the standpoint of its size, diversity of climate, and its material resources. This should be followed closely by studies of its population, its racial groups, and the influence of its former religious orthodoxy, and then brought to date thru contrasting its earlier despotism with that of its later radicalism. Upon what basis can the political integrity of Russia be developed? Can its vast territorial stretches be cemented into true national unity? Compare it with China: in the past both were politically and religiously ultra-conservative; both are now undergoing the trying processes of national reorganization. In what respects, in each of these cases, is the outcome of interest to the world at large? Do the other members of the family of nations have a stake in the survival or demise of either of these two political sovereignties?

The British Empire provides a subject of unquestioned world interest and one whereby the western world can be effectively introduced. The phases to be emphasized in a study of the British Empire are first, the small size, the limited resources, and large and industrious population of the home country; second, the colonial possessions, particularly in Africa and the Orient; and third, the overseas dominions in their rôles of self-governing organisms. These

lines of inquiry present the opportunity and the necessity of comparing the home country with other great European powers and with Japan. As a colonial empire, England should be compared with. France and Italy, and this comparison quite logically will lead to a discussion of the present partition of Africa among the European countries. What conditions are conducive to the establishment of the British Empire as a prominent defender of the present status quo? In the third instance, namely, that of England as the mother country of a commonwealth of self-governing nations, the British Empire stands unique among the countries of the world. In this connection major attention should be devoted to Australia, New Zealand, the Union of South Africa, and Canada. In these we have the units which, together with England, make up the true greatness of the British Empire. Of what significance to modern civilization is the success, or the eventual potential failure, of the British Commonwealth of Nations? Is there involved an issue of vital importance to the western world and particularly to the United States of America?

THE NEW WORLD

Part IV of this proposed course should be devoted to the New World. First should come a résumé of the Latin American countries, taken up not individually, but by groups. I would begin with the Caribbean region for it is there we have the contacts of European colonial interests with the independent nations—small and large. The causes of the political instability of the effervescent middle American countries should be traced to their roots in historical, racial, and geographical factors. Of what significance is that instability to the other countries of the world, and particularly to those which are in close proximity? This study should be followed by that of the west coast countries of South America from Ecuador to Chile inclusive. The relationship of boundary disputes and national animosities to the distribution of resources—real or fancied—would provide the chief motif in this study. Thence we should consider Argentina and Brazil, comparing the two nations as related to their contrasting environments. In this connection the attention of the students would be directed definitely toward the international relationships of the two countries, particularly with the United States.

The closing unit of Part IV would be a résumé study of the United States as a nation. A somewhat more detailed picture of our geographical conditions, natural resources, distribution of popula-

tion, and racial heritage should be taken up than was developed for any of the preceding countries. Nevertheless, here as with the other nations, particular emphasis must be laid upon the United States as a political organism which functions as a unit. This would give opportunity to study the significance of the international problems—the significance to the United States of the larger problems recognized among other nations in the previous chapters. This unit should close with a consideration of the major domestic economic and social problems which face the people of the United States, those which must be met and will be handled more or less efficiently in the light of world conditions thru the years that lie immediately ahead.

INTERDEPENDENCE VERSUS NATIONALISM

Part V, the closing section, I would label "World Interdependence." Under this caption I would deal with the forces and organizations which are now at work and which tend gradually, perhaps all too slowly it would seem, to bind the various parts of the world together. Among such organizations and movements I would recognize the existence of international scientific societies, particularly the Red Cross, the Postal Union, the multi-lateral treaties, the League of Nations and the World Court. These cannot be studied in detail, but the significance of their existence should be stressed. It is a matter of more than passing interest that international organizations such as those named have been formed and are functioning successfully. It shows that internationally we have made progress; we have advanced in some measure from the "Robinson Crusoe" stage of national existence. We have begun to learn how to live together in the world's apartment house.

Such, in brief, is the function and the generalized outline of a course in social studies that I would plead for in the senior high school. It would be geographic because it would anchor firmly its basic material in the environmental relationships, but it would be more than political geography. It would reach into the realms of economic resources, of historical factors, and of social and political relationships, and weld them into a homogeneous whole. This line of study, if carefully and systematically pursued, would unquestionably aid the student in acquiring a deeper understanding of the varied problems which now confront the peoples of the world. That the development of a broadminded, intelligent citizenry is necessary for the onward march of organized society seems obvious. In this task political geography, in conjunction with and supplemented by other social studies, promises to play a leading rôle.

INTERNATIONAL PROBLEMS: A STUDY IN POLITICAL GEOGRAPHY

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In the high school at Bloomington, Illinois, Physical Geography and Economic Geography have been offered as regular courses in geography for many years. Physical Geography has been given in the first year of the four-year high school course and Economic Geography in the third year, each subject for one semester.

In 1933, the principal of the high school requested that a semester course of geography be outlined for seniors. His desire was for a course, geographic in nature, that would give high school seniors an understanding of the world today from a more advanced point of view than is possible in earlier school years. High school seniors are preparing to enter the world of economic life and commercial activity. They have reached a period in their educational development that enables them to view the home locality and the world from an adult standpoint. These young people are usually eighteen years of age and are expected, on the completion of their high school course, to enter suitable fields of industry whereby they may earn their own living. There is no more appropriate time for presenting significant problems of the world in their geographic setting than in the senior year of the secondary school curriculum.

The term "International Problems" was selected as a title for the course. The field of study is world-wide in scope, and the center of interest for special study changes with the changing problems of international situations. The introduction to the course includes a study of the nations of the world in their geographic and economic relations. Special study is then made of leading nations with emphasis on those countries or regions which may, at the time that the study is being made, have special significance.

This course is now being offered for the third time. The class discussions are based on the previous training of the students and on textbook and library sources available. Students prepare comparative tables from statistical sources. This preliminary study may occupy from two weeks to six weeks of the semester, depending on the comprehensiveness of the survey undertaken. The shorter period permits the making of comparative tables based on the larger geographic aspects of the leading nations and the selection of ten or

twelve countries of chief importance. The longer period gives opportunity for a more extended comparative study with the grouping of all the nations into specified groups on a basis developed during the study. During this period, students make a study of the general structure of the League of Nations as a world organization. They classify the nations of the world into groups based on the relation of the nations to the League. This acquaints them with the nations of the world, large and small, and builds a geographic foundation for constant use during the course. Other bases of world study of nations may be carried out to advantage during a six weeks period.

At the present time some of the international problems that may be considered from the world point of view are: disarmament conference, the question of naval strength, international labor problems, outlawry of war, investigation of the munitions industry, population tendencies. Some of the items to be tabulated in this preliminary survey of the nations are: area; population; density of population; coal production and coal reserves; iron ore production and iron ore reserves; pig iron and steel; petroleum production and reserves; railroad mileage in ratio to area and population; motor highways; merchant marine, including tonnage and number of vessels; value of imports and exports; navigable rivers; seaports and harbors; number of cities of specified population; kind of government.

The individual tabulation of geographic facts leads to student participation in class discussion. The selection of ten or more countries as leading nations of the world, based on statistics, calls for thoughtful correlation and evaluation of facts. It gives training in using source material, and develops an attitude of mind which weighs evidence in order to reach sound conclusions. Students find new and unexpected relationships appearing as the study proceeds. They find it necessary to revise pre-conceived notions of relative importance among nations, especially the standing of the United States when compared directly with leading nations of the world.

A list of leading nations, as determined by the students, usually includes Great Britain, France, Germany, Italy, Russia, China, Japan, and United States. A more extended list brings wholesome class discussion based on the facts assembled. The order of study of selected countries is determined by present-day problems. The United States is studied last. Students are thereby qualified to consider our

country with specific knowledge of other countries as a background. They are ready to examine critically the United States and to compare it understandingly with other countries.

In working out these several units, students are expected to read available material as widely as opportunity permits. In the absence of a satisfactory textbook, a commercial geography text is employed for the references which it has on the general geography of the countries studied and also for the statistical facts and summaries included. This is supplemented by extensive library reading from such references as Bowman's, The New World, Statesman's Yearbook, publications of the League of Nations and of the Carnegie Endowment for International Peace, the Department of Commerce Yearbooks; and such magazines as Foreign Affairs, Current History, Harpers, Review of Reviews, the Atlantic Monthly, the magazine section of the Christian Science Monitor, and the Sunday Supplement of the New York Times. Stress is also laid upon the value of the daily newspaper as a source of information regarding current international affairs.

In connection with the study of a country, each pupil organizes his material in outline form. The following outline on Italy is one which was prepared by one of the students and is typical of those worked out by each student.

Italy

I. Political and Economic Life in Relation to its Geographic Situation
  A. Reasons for its present state
    1. Historical background unlike other countries
    2. Inheritance of division and conflict
    3. Masses do not desire self-government
    4. High percentage of illiteracy
    5. Many small parties and factions
    6. Masses untrained in public affairs
    7. Personalities more prominent than policies
  B. Explanations given for powers vested in government
    1. Public business requires trained men
    2. Administrative capacity of average citizen inadequate
  C. Commercial opportunities
    1. Center of Mediterranean Sea
    2. Peninsular position
    3. Trade thru Suez Canal and Strait of Gibraltar touches Italy
    4. Midway between East and West
    5. Several first class harbors
    6. Large merchant marine
  D. Industrial handicaps
    1. Natural deficiency in fuel

2. Fisheries of minor importance
3. National deficiency in forests
4. 13 per cent of land unproductive
5. A fourth of surface in pasture and meadow
6. A third of total grain consumption imported
7. Lack of minerals

II. Geographic Background of Italy as a Commercial and Industrial Nation

A. Attraction for tourists
1. Beautiful lakes among Alps
2. Blue waters of Mediterranean
3. Picturesque shore line
4. Active volcanoes
5. Mediterranean climate
6. Ruins of ancient empire
7. Wonderful art galleries, museums, and churches

B. Size

Area: 119,700 square miles; ½ size of France, ¾ size of Germany, twice as large as New England States

Population: 42,875,000; Same as France, 2/3 population of Germany, 5 times population of New England States

C. Location

38-45 degrees north latitude; 7-18 degrees east longitude

D. Surface

North: Alps separate Italy from Switzerland and Austria
Central: Apennines form backbone of peninsula
Between Apennines and Alps; Po Valley
Western: Arno Valley, Campagna Valley, Neapolitan Plain

E. Rivers: Po and Tiber

F. Industries
1. Agriculture: leading industry; engages 50 per cent of workers
   Po Valley: in westerly wind belt; sufficient rainfall; rich soil; level land. Crops: wheat, rice, Indian corn, potatoes, vegetables, hay, fodder, mulberries
   In South: Mediterranean climate; horse latitudes; irrigation necessary. Crops: grapes, olives, wheat, oranges, lemons
2. Domestic animals: mules, oxen, and donkeys used in place of horses; sheep and goats supply milk; Upper Po, noted dairy district; chief dairy product is cheese
3. Silk: largest producer in Europe; surpassed only by Japan and China; extensively manufactured in northern Italy
4. Macaroni made from wheat
5. Leghorn hats made from wheat straw
6. Beads and necklaces made from coral
7. Statuary made from alabaster or marble

III. Italian Colonial Expansion

Italy moved on Mediterranean orbit
Slow to build up colonies
Principal object trade, not territory
Only poor territory left for Italian appropriation
Libya: area, less than 50,000 square miles; desert country of no particular

value; population, 750,000; principal exports: animal products, fish, sponges
Eritrea: population 5,000 Italians
Somaliland: population less than 5,000; trade with Italy slight; possibility of increase slight; white colonization cannot make headway; arid climate; limited water available for irrigation

IV. Rise of Fascism

A. Dissatisfaction result of World War
Reasons for dissatisfaction
1. Little increase in national territory
2. Loss of material wealth
3. Great debt incurred
4. Necessity for restoration of devastated regions
5. Unemployment of demobilized soldiers
6. People no longer welcome in overseas countries
7. Opportunities in Italian colonies very slight
Results
1. Dissatisfaction with government
2. Communistic doctrine spread
3. Mussolini came forward to prevent communism becoming the leading factor in the Italian government

B. Policy of Fascism in Italy after the War
1. To revive the national spirit
2. To aid in the maintenance of order
3. To combat the communistic union by military discipline

C. Principles of Fascist Program
1. Internal workings of new system of government
   a. Extension of powers of Premier in relation to the king, the ministers of government, the legislature
   b. Extension of powers of central government over local government even at the expense of civil rights
2. Foreign policy
   a. Assertive strong central government not responsible to public
   b. Reasons for failure of policy
      (1) Colonies poor and unimportant
      (2) Development costly
      (3) Very little emigration to Africa
      (4) No diversion of Italian energy
      (5) Land arid and unproductive
      (6) Government lacks colonial experience and capital for the development of colonial enterprises
3. Industrial policy
   a. Labor subject to state supervision
   b. Union for each art, trade or craft
   c. Labor disputes appealed to labor magistrates; decisions of such binding for both sides and backed by force if necessary
   d. Strikes and lockouts prohibited
   e. Ideal: to assure employers that workers will not abandon their work, and to assure laborers that employers cannot bring them to terms by pressure of unemployment

D. Arguments to Bolster Fascism
1. Saved Italy from grave disorder, anarchy, and disunion

2. Objects of liberty and democracy may be won in different forms in different countries
3. Fascist principles fit fundamental character of Italian people, their state of education, and degree of interest in politics
4. Democracy unsuited to Italian temperament and traditions

E. Arguments against Fascism
1. Prohibits freedom of speech and press
2. People given no voice in government
3. Destroys parties and party powers
4. Enforces rather than invites patriotic activities
5. Is itself judge of what is patriotic

''If one defies the arbitrary methods of the present government of Italy on the ground that it affords no opportunity for expression of public opinion, one must first make sure that the people have a desire to express it. Fascism believes that there is not, and cannot be, a public opinion because of the low level of education of the masses.''

Educational administrators are quite agreed as to the contribution which a course on international questions makes, and they are ready and willing, in many cases to find a place for it in the school curriculum. Students likewise are enthusiastic. The opportunity seems ripe for geography to expand along this line in the modern high school. Much needed and helpful assistance toward this end would be provided by the appearance of satisfactory textbooks in political geography at the high school level.

THE GEOSTRATEGY OF LOCATION

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Only 5,000 years and 4,000 miles separate the pioneers of Western civilization in the river valleys of the Middle East from the aerial pilots of the future in the Mediterranean of the Arctic. Man's knowledge of the earth has increased while his methods of warfare have changed. The early Egyptians and Babylonians, located along their river valleys, only knew the importance of land power represented by armies; the Cretans and the Athenians, living along the inland sea of the Mediterranean, realized the significance of sea power expressed by navies; later the British, located on the geographical periphery of western Europe, looked to the world ocean for expansion while the Russians, situated in the heartland of the world island, placed their stress on land power; finally the polar states, noting the Great Circle routes across the Arctic in an age of air power, look to the polar skies of the future.

RIVER VALLEYS

The cradles of Western civilization were located in the river valleys of the Nile in Egypt and the Tigris and Euphrates in Mesopotamia. Here the environment offered a favorable but not too easy existence for man. The Nile and the Tigris and Euphrates not only furnished the fertile soil for crop production but also provided the floods that taxed the ingenuity of the inhabitants. The Biblical account of the deluge may have a historical origin in the floods of the Tigris and Euphrates. The climate of the area was conducive to an existence based primarily upon agriculture. The famous law code of Hammurabi reflected the influence of the environment especially in the careful provisions for the supervision of waterways. The rivers also provided the avenues of trade in a period when the muscles of man and the winds of the sky were the motive power of ships. The river valleys became a unifying factor in the political development of the peoples. Egypt and Babylonia could not remain separated into upper and lower divisions. Menes (c.3200 B.C.) united Upper and Lower Egypt just as Sargon I (c.2630 B.C.) united Sumeria and Akkad in Mesopotámia.

However, the civilizations of the river valleys were not destined to remain isolated. The Fertile Crescent, extending from the Mediterranean and Red Seas on the west to the Iranian mountains on the east and from the Armenian highlands on the north to the Persian Gulf and Indian Ocean on the south, became an avenue of trade and conquest. First the Assyrians under Sargon II, then the Persians under Cambyses, and later the Macedonians under Alexander the Great used the Fertile Crescent as an avenue in ruling both of the cradles of Western civilization. Significantly the might of all these early peoples was based solely on the land power of armies.

INLAND SEA

The inland sea of the Mediterranean was the next great scene of man's activity. Thruout history the Mediterranean has served either as a unifying or as a separating factor. Rome was the only world state ever to rule all the littoral areas of the Mediterranean. Most of the time the shores of this great sea have been jealously guarded by the navies of rival states. The first navy to appear in the Mediterranean probably came from Crete. The fleet of the rulers of this island controlled the eastern Aegean Sea while Cnossus became one of the leading commercial cities in the world.

The power of the kings of Crete came to an abrupt termination around 1400 B.C. Later the Phoenicians on the shores of the eastern Mediterranean with the bases of Tyre and Sidon rose to prominence. Phoenician ships ventured to the shores of Africa, Spain and even Britian while colonists from Tyre founded Carthage in 800 B.C. Only the defeat of the Phoenician navy and the siege of the island base of Tyre enabled Alexander the Great to end Phoencian sea power in 333 B.C.

The ancient Greeks naturally turned to the sea: the total area of Greece was only 45,000 square miles; many inlets and bays occur along the south and east coast; the land is mountainous while the valleys and coastal lowlands are narrow. Xerxes of Persia was defeated by the superior navy of the Athenians in the battle of Salamis in 480 B.C. The Golden Age of Pericles saw the Athenian Empire ruling over most of the islands and coastlines of the Aegean. The Spartans in the Peloponnesian War finally were able to capture the city of Athens only after defeating the Athenian navy with Persian financial aid.

The Romans began as a land power in the central part of the peninsula that occupies the waist of the Mediterranean. Italy separates the western basin of the Mediterranean with its length of 900 miles from the eastern basin with its length of 1,000 miles. Only the menace of the Carthaginian navy in the First Punic War caused the Romans to build a fleet of their own. Eventually the Carthaginians were defeated on sea and on land in the Punic Wars. After all of the shores of the Mediterranean were conquered by the Roman legions, Mare Nostrum became a reality of the Caesars and the Roman navy was allowed to decline. Rome once more became primarily a land power with all roads around the inland sea leading to the Eternal City. At the zenith of the territorial expansion of the Roman Empire under Trajan around 100 A.D., natural boundaries marked the extent of the laws of Rome—the Atlantic on the west, the Danube and Rhine rivers on the north, the Tigris and Euphrates on the east, and the Sahara and Arabian deserts on the south. After the fall of the Roman Empire the Mediterranean once more became the scene of hostile naval forces—the Saracens and Normans, the Venetians and Genoese, the British, French, and Italians.

WORLD OCEAN

The geographic discoveries of the 1400's turned the attention

of the western world from the inland sea of the Mediterranean to the world ocean. The early writings of Marco Polo about Persia, China, and India; the invention of the mariner's compass and the making of maps; the eagerness of the Atlantic seaboard states to break the monopoly of the Italian city states in oriental trade; and the explorations of Diaz, Vasco da Gama, Columbus and Magellan —all played their part in the transition of geographical thought to the world ocean. Spain and Portugal led in the early period of discovery with the famous Papal Demarcation Line of 1493 as a symbol of colonial arrogance. The decline of the Spanish and Portuguese empires heralded the rise of the Dutch, French and British. The defeat of the Spanish Armada in 1588 placed the British navy in a leading position just as the defeat of Napoleon's fleet at Trafalgar in 1805 marked a decisive triumph of British sea power.

The oceans of our grammar school days—the Atlantic, the Pacific, the Indian, the Arctic and the Antarctic—have become one world ocean. As a result of Lord Nelson's victory at Trafalgar, the British navy ruled this world ocean. In the War of 1812 the British blockaded the American seaboard and Washington was burned in 1814; in the Opium War of 1840-42 the Chinese were defeated and Hong Kong was annexed; in the Crimean War from 1854-56 British ships carried soldiers thru the Mediterranean and Black seas to the Crimea while naval units even raided Petropavlovsk in Kamchatka; thru the Nineteenth Century the British were consolidating their gains in India while Victoria became Empress of India in 1877; finally at the end of the 1800's the British were fighting the Boers in South Africa 6,000 miles away from the homeland. The British Commonwealth-Empire, covering one-fourth of the land area of the earth, is a tribute to sea power.

By the outbreak of the Second World War all the great powers had navies altho the three big navies were the British, American and Japanese. The French, Italian, German and Russian navies ranked below the "big three." By the summer of 1944 the naval balance had changed: the French navy had been largely scuttled at Toulon; much of the Italian fleet had come over to the United Nations; the German navy had been greatly reduced; and the Japanese fleet had been driven back to its home waters. After the war only two world navies will remain—the British and the American. From the viewpoint of sea power the Atlantic will be divided between the British and American fleets while the Pacific will largely represent American sea power and the Indian, British. Eventual-

ly China and Russia may develop big navies depending upon the growing unity of the former and the fulfillment of the latter's desire for warm water ports.

WORLD ISLAND

Only a strong land power in back of the coastline could have checked the British in their expansion in the Nineteenth Century. If the United States and China had been firmly unified, the British from their faraway home base could never have penetrated behind the coastline of these states. Due to the influence of the distinguished British geographer, Sir Halford Mackinder, and the illustrious, if not infamous, German geographer, Major General Karl Haushofer the significance of the distribution of the land mass of the earth is being analyzed. Formerly in grammar school we were taught that seven continents existed—Europe, Asia, Africa, North America, South America, Australia and Antarctica. The geopolitical concept of the world island is frequently discussed, tho not always accepted. The world island consists of Europe, Asia and Africa. Europe is really a peninsula of Asia separated by the low Ural Mountains just as India is a peninsula separated from the rest of Asia by the lofty Himalayas. The plains of northern Russia extend westward into the plains of northern Europe, serving as a military highway both east and west. Africa is joined to Asia at Suez and almost at the Strait of Bab-el-Mandeb. Africa is only twelve miles removed from Europe at Gibraltar and ninety miles at Sicily. The Nile River, Red Sea and the Tigris-Euphrates rivers are parallel depressions in the physical unity of Africa and Asia. The Mediterranean Sea is well named—in the midst of land—Europe, Asia and Africa.

The world island contains seven-eighths of the earth's population, two-thirds of the land mass, and the bulk of the natural resources of the earth. Here were located six of the seven world powers of 1939—the Soviet Union, Great Britain, France, Germany, Italy and Japan. The development of air power in the Twentieth Century scarcely justifies the separation of the British and Japanese homelands from the world island by calling them offshore islands. In an age of sea power, this thesis was valid but not in an age of growing air power. Historically the powers of the world island have been located on the coastland or rimland. Sir Halford Mackinder believes that the fulcrum of power in the world island has shifted to the heartland, the area in general between

the Volga and Yenesei basins, as he has recently defined it. On the other hand, Nicholas Spykman asserted shortly before his death that the rimland of the world island is still the vital area. Most geographers agree that the control of the world island by one power would be a menace to the security of the United States, the only great power outside the world island. The Germans and the Japanese in the Second World War have tried to control the rimland of the world island and isolate the Soviet Union and China. At the high tide of Nazi aggression in the fall of 1942 one pincer of the Germans extended to the very streets of Stalingrad while the other reached almost to the outskirts of Alexandria. After a possible meeting of the pincers in Iraq or Iran, the Germans planned to move toward turbulent India where they might join the Japanese already established in Burma, and the Andaman and Nicobar islands. The siege of Stalingrad may go down in history as the turning point of the Second World War.

ARCTIC MEDITERRANEAN

The development of air power has recently resulted in a new emphasis on location. The polar areas of the Arctic, an inland sea of the Atlantic, may become very important in an air age. Such men as Vilhjalmur Stefansson and George T. Renner have emphasized the strategic importance of the area. This importance lies in the Great Circle routes from America to Eurasia over the Arctic. Three-fourths of the land mass of the world is in the northern hemisphere grouped around the North Pole. The shortest distances from Chicago to Chungking, from San Francisco to Moscow, from Panama to Singapore, and from the North Cape of Norway to Des Moines, Iowa are via the Arctic. The Soviet fliers in 1937 took a forward step in their flight from Moscow to California over the polar area. At present flying conditions in this part of the world are bad. Instrument flying, radio communications, and beam control are impaired by magnetic and electrical disturbances in polar areas. Problems of thawing out controls, warming engines, and handling metal bombsights are caused by the cold polar air. However, it is no colder 36,000 feet above the equator than over the North Pole. The difficulties of Arctic flying will undoubtedly be mastered by aviation. Finally the presence of oil in the northern areas of Alaska, Canada and Siberia may eventually be an asset of tremendous importance for the development of Arctic routes.

The polar states of the present are the Soviet Union, Canada,

the United States, Norway, Denmark and Finland. The Soviet Union has made the most progress in developing the Arctic. The many meteorology stations, the ice cutters of 11,000 tons, the research in polar flying, and the expansion of maritime commerce along the famous northeast passage during the months of August and September are proof of Soviet Russia's initiative. Canada has not been so active partly due to the fact that the northwest passage along the northern areas of the dominion is not so navigable. Alaska is the only polar area under the American flag in peacetime. Point Barrow in northern Alaska is the site of a naval oil reserve of 30,000 square miles altho no petroleum has been acquired from this area yet. Greenland and Iceland are both occupied by American troops but the mother country is Denmark. Greenland is a vital strategic outpost of the United States as well as a valuable location for weather prediction in Europe. Iceland was united to Denmark by a common king but the former planned to become a republic in June, 1944. Norway's role in the Arctic is due to the strategic location of the North Cape and to the control of Svalbard. This island has seen fighting in the Second World War with British, Norwegian and German troops struggling for the mastery of the area. This is as far north as the battlefields of the Second World War have extended. Finland possesses Petsamo in the Arctic with the valuable deposits of nickel nearby. However, the Soviet Union will probably annex Petsamo at the conclusion of the present war. The strategic location of Russia in the heartland may be supplemented by the position of the U.S.S.R. on the Arctic Mediterranean. Altho the Arctic may become important in future aviation, it will never become a base for world power like the middle latitudes.

The change in the importance of any geographical location is due to the technological advance of man. Land power, sea power and air power have all vitally affected the strategy of a given area. Land power united the peoples of the valleys of the Nile and Tigris-Euphrates; sea power enabled the expansion of the British over one-fourth of the earth's surface; air power may turn many of the valueless wastes of the Arctic into strategic locations. Probably the land, sea and air horizons of the world have already been reached. The future people of the Twentieth Century may utilize either for constructive or destructive purposes the earth of the Creator.

GEOGRAPHICAL REGIONALISM OF WORLD PROBLEMS

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America's total defense participation in the present global war constitutes in itself the most convincing argument for the need of an educational renaissance in the field of high school and college geography.

Events associated therewith reveal at least a two-fold disillusionment in geographic philosophy: 1) That the United States can economically and politically isolate itself from world affairs; 2) That this isolation principle may extend itself even educationally to a point of ignoring those very territorial and other geographic factors and principles out of which grow most of the world problems.

It appears to the writer, therefore, that the lack of a geographic defense in the sense of a geographic knowledge of world affairs has been as much responsible for our belated preparedness program as any other single factor.

This condition seems attributable 1) to the general indifference with which many educators and government officials in the past have viewed the geographic factor in national and international problems, and 2) to the belated development by American geographers of geography courses and curricula specifically organized to meet the needs of the human geographer, the historian, the economist, and the social and political scientist.

High school and even college graduates have little or no space consciousness of world affairs. Since they comprehend neither the space relations of the strategic spots of world events nor the type of environmental conditions under which the events happen (which is really the essence of location), such students live in an ethereal world devoid of areal realities.

It takes a World War to awaken the American press suddenly to the realization that maps can illuminate the events of the day in a more effective way than any other single mode of expressing spatial and environmental relations. Yet, if we don't supply geographic education in the present generation better than we have in the past, it will probably take another World War before the press generally advances to the point of abandoning the almost

universal practice of using the navigator's Mercator projection, with its grotesque caricaturization of territorial dimensions, to picture world events.

Much of this mediocrity, complacency, or whatever we want to call it, of geographic spirit, learning, and understanding in America seems traceable to our very departmental doorstep.

If geography is to constitute a meaningful, purposeful, and useful area in civic education, it must be so organized as to fit in with life's everyday activities. Geographic facts and principles must be presented in such a way as to build up a national consciousness of the implications of geographic factors and forces in the problem of the community, of the nation, and of the world.

Geographic offerings will be presented in such a way that the fellow academicians as well as the press and the public will recognize that geography deals with life as well as land, with people as well as places, with philosophical and geo-political ideas, and problems, as well as with maps. Only in this way will the geographer bring to his field and himself the public recognition he deserves for the contributions he is prepared to make to society but which for the most part at the present go unrecognized as geography.

American Geographic Education as Compared with the European

A geographer in Europe is a recognized authority of a highly respected field of learning and public service. In America the geographer is just beginning to make his influence felt in academic and public circles.

That the problems of society in many cases have a definite regional base is a concept which we in America have been slow to grasp. Scores of contiguous counties may still be found in many sections of the United States, for which not a single topographic map exists upon which to base regional geographic studies.

Aroused by the exigency of national defense, the United States Civilian Defense Council is now experiencing the dire need of community and regional maps to give geographic perspective to their objectives.

One is reminded here of the comprehensive cartographic surveys in England where the entire country-side has been mapped, and this as a joint project in which both the schools and the government participate. Indispensable as it is in building for a sound

peace-time land-use economy, such land inventory analysis now constitutes the very foundation upon which England's national defense, especially against air raids, is built.

The extensive geographic fact-finding mapping program and regional land-use adaptation studies by Russia in recent years may well help to explain the basis for the phenomenal resistance and counter offenses offered by the Soviets against the superiorly mechanized German forces. Application of the principle of geographic adaptability, or the law of comparative geographic advantages of regions, has probably been more instrumental in building up the stability of Russian agriculture and industry than any other one thing.

Either because of the feeling that regional planning is incompatible with the democratic way of life, or because of a lack of understanding of its geographic objectives, Americans in many quarters, on the other hand, question the soundness of a regional planning program such as is developed by the National Planning Association.

How a certain type of geographic philosophy can so revolutionize a political science point of view of a state as to threaten the independence of all nations is uniquely illustrated in the "Geopolotik" of Germany, developed particularly by Haushofer, a German geographer. "Geo-polotik" as defined by him is an earth-state concept in which "Raum" (space) and "Lage" (position) form the geocentric basis for Hitler's "Blut und Boden" (blood and soil) campaign to conquer the world.

This instance again illustrates how complacent or short-sighted American officialdom and for that matter American geographers and political scientists have been over against this aggrandizement propaganda of the Nazis. Unmap-minded Americans seem to find difficulty in following the Fascists' and Nazis' objectives because they have become habituated to think of the totalitarian objectives in psychological rather than in geographical terms. The result has been a feeling of smug security in our democratic way of life.

The philosophy of geographic isolationism has thus found America not only militarily unprepared but geographically unprepared as well. Our boys and girls must be contented for the most part to get their geographic education, what little they get, from non-geographic sources and non-geographically trained teachers. Even many colleges, tho they may have an otherwise comprehensive curriculum, still do not offer a single course in geography taught

by a full-fledged geographer.

SOME SUGGESTED SOLUTIONS OF THE GEOGRAPHIC EDUCATION PROBLEM

How can these deficiencies be corrected? How can America be made to realize that practically every epoch-making social, economic, and political problem whether of local, national, or international scope, has its geo-centric implications? Here are a few suggestions:

1. We must obviously introduce regional geography courses in the four-year high school, taught by teachers trained and licensed to teach geography, with the same qualifications as is expected of teachers of other standard disciplines.

The High School Standards Committee of the National Council of Geography Teachers is now about to propose to the high school educator, administrator, and certificating agencies the adoption of certain minimum geography teaching standards.

2. It would seem highly desirable that such colleges as do not now have geography courses, introduce geography courses immediately.

3. Old as well as new departments of geography, it seems to us, should be made, wherever practicable, administratively independent of other disciplines in order that the proper emphasis may be placed on the development of its own subject matter.

4. If geography is to develop mainly along the lines of citizenship training and world problem analysis, as brought out in the theme of this paper, then a social science divisional, rather than a natural science divisional affiliation seems the more logical.

Geography has become a dynamic science of peoples and problems. Indispensable to the geographer as are courses in straight climatology, geomorphology, etc., to the training of a geographer, such courses in themselves do not guarantee geographic thinking in terms of human problems. The most professionally trained physiographer may not qualify at all as a regional geographer, but a proficient geographer will have had training in physiography and other related disciplines.

If it seems inexpedient to classify all geography courses as Social Science, then the next desirable alternative would seem to place such courses as meteorology, climatology, physiography, geomorphology, and cartography in the physical category, and the regular principles and regional geography courses—social, eco-

nomic, political, conservational, and continental—courses in the Social Science division.

That the Social Science orientation and organization of modern geographic offerings in whole or in part promise to solve our curricular and administrative problems better than any other seems to be testified to by the fact that 85 per cent of our high school administrators and certificating authorities, as found by a survey of 29 representative states, classify geography with the Social Studies.

From the list of universities granting doctors degrees in geography, as reported by Pico,* one is likewise impressed by the fact that those granting by far the larger number of degrees have associated geography either exclusively with the Social Science division or affiliated it jointly with the Social and Natural Science divisions.

5. In addition to the social divisional affiliation, it would seem wise specifically to adapt the courses of our geography curriculum as much as practicable to the development of geo-social, geo-economic, and geo-political concepts so as to unify functionally as well as administratively the work of our department with that of the other social sciences.

SPECIAL COURSE IN WORLD PROBLEMS

Tho various courses in geography can be so organized as to stimulate an interest in the environmental basis of human problems, a special course devoted to World Problems would seem to be a definite asset in every geography curriculum. Such a course may deal with an investigation of current social, economic, and political problems of selected regions or nations in terms of the material and ethnic factors of the environment which are considered essential in understanding such problems. Patterns of population and of land utilization, natural resources, the economic interdependence of nations, and international trade relations, are type topics serving as the geographic basis for discussing current conditions and events.

To get the proper social orientation and motivation for this course material, it is suggested that we:

1) Encourage economics, history, and political and social science majors with some basic geography training to join the geog-

* Rafael Pico. Geography in American Universities. The JOURNAL OF GEOGRAPHY, Vol. XL, No. 8, November, 1941.

raphy majors in class forum discussions. 2) Focus attention on current events in the form of individual world problems projects. 3) Organize and orient material as much as possible demographically and cartographically. 4) Critically analyze the genuineness of geographical quality of the project material. 5) Provide a laboratory for original map-making; also a library of periodicals, the maps and illustrations of which may be deleted at will for use by the individual members of the class.

Presentation of individual projects by members of the class in the form of preliminary formal outlines submitted for class criticism, followed by brief essays based upon them, constitutes a creative unit enthusiastically participated in by all members.

One of the chief virtues of the course is that it develops a true geographic point of view of not only world problems but of geography in itself. Elimination of non-geographic material at all times is one of the chief objectives in class criticism.

A technique found helpful in assuring a geo-centric analysis of world problems is to provide a list of all the physical-cultural factors of geography considered essential for regional analysis.

Highly discriminative selectivity in choosing the particular factors most germane and cogent to the particular problem and region in question should be stressed at all times. This selective process leads to a sort of key classification of geography factors and the geographic relationships to be looked for in the survey of world problems. It helps at once to solve the problem of recognizing problems, of seeing thru them, and subsequently rationalizing the regional problems in those geographical terms which are considered essential to a regional problem synthesis.

Several examples may be submitted to illustrate our point:

1. To many Americans our outpost establishments in "distant" Alaska, particularly in the far-flung Aleutians, have little or no significance commercially or militarily.

A particular map projection—the butterfly conic—showing that southern Alaska lies on the great circle route to Japan and, therefore, on the most direct route, soon disillusions the Mercator-minded individual.

2. To the interior plains isolationist whose only concept of our defense has been based on the age-old conventionalized map pattern of a world represented as two divided halves isolated from each other by sea barriers, the new discovery of the fact that Bismarck, North Dakota, is as near to Tokyo, Japan, as is Los Angeles,

California, must come as a distinct shock.

Convincingly simple as it is to observe such proximate territorial relations, why is it that we had to wait until well along in a war before the American people discovered that any place on the globe may be made the center of a hemisphere and that such a hemisphere may show more significant world relations than does either the Western or the Eastern Hemisphere? Truly, globe-mindedness and a bit of the right kind of geographic education before the war might have steered our international diplomacy and our national defense program in such a way as to prevent the piecemeal conquests of the totalitarians.

So much for the physical side of our earth in its influence on the geo-political picture.

3. Geographic regionalism may often clear up confused ideas concerning a social, economic, or political situation, which result from a fallacious line of geographic reasoning or a false geographic premise.

Let us turn to an example of the demographic factor as part of a present day disturbing geo-political situation.

A prominent Moslem contends that Indians should be given immediate and absolute independence. The integrity and security of a national state thus freed, the Moslem does not question. Its preparedness to defend itself is taken for granted.

As everyone knows, the ethnographic composition of India's population is highly diverse. This, for the Moslem spokesman, does not create a governmental administrative problem any more than in the United States, for, as he points out: Does not also a heterogeneous mixture exist here in the states?

The trouble with this line of reasoning by analogy is that it is statistical instead of geographic. It disregards the all-important fact that, except for the colored section in the South and a few minor foreign racial enclaves elsewhere in the United States, there is no parallelism between the two countries at all in the "pattern" of distribution or "arrangement" of the diverse elements of population. Whereas the United States represents essentially a diffused distribution of its various social elements, India is a mosaic of quite definitely defined geographic units, each region dominated by a particular political, racial, religious, or linguistic group. Thus, India does not constitute a unit at all but is made up of a "regionalized" division of Hindus, Moslems, Jains, Sikhs, Animists, Buddhists, and other groups, each of which would have independ-

ence, or even politically aspire to the control of the whole of India. It would be much more accurate to compare the regional ethnographic structure of India to all of Europe than to that of the United States.

The present example illustrates the indispensability of a regionalized analysis of political and other issues. The trouble is that this type of contribution is not generally recognized as geographic, and hence the geographer gets little or no credit for developing the science of geographic regionalism. The term "geographic" seems grammatically redundant here, for is not regionalism of itself a purely geographic concept, the very essence of geography? Its inclusion here then is for added emphasis to make us geographers fully conscious of the need of clarifying for ourselves and especially the American public the field and function of modern geography as based on the phenomenon of regionalism.

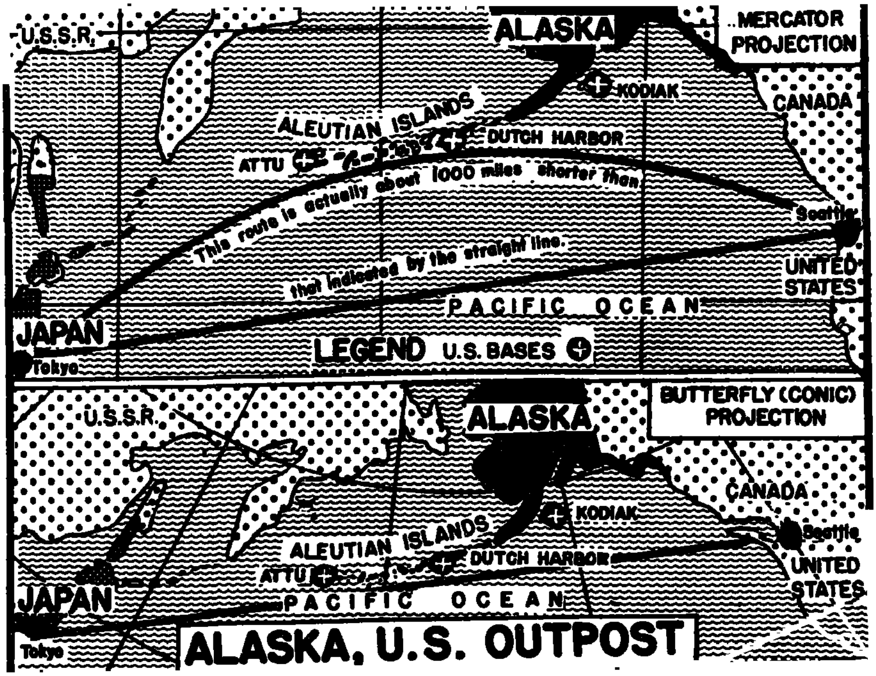
Studies of the type illustrated above can be publicized, as was done during the past year by a class in World Problems. A weekly feature entitled "The Chorographer" appeared in the local city press regularly once a week. Each contribution is headed by a challenging question, such as:

1. What resources in the Ural mountain region lead one to believe that Russia might hold out if Moscow falls?
2. What regional conditions make Australia an excellent base for an allied stand and counter attack?
3. Why did Chile hesitate to join the Allies? (A study in shape-regionality.)
4. Why does the United States need to ration rubber? (A study in regional rubber production-consumption relations.)

Each topic was treated strictly geographically and illustrated cartographically. One of the map studies is illustrated here. This press feature received favorable editorial comment.

Publicized studies such as these help to clarify the view that geography is not simply a combination of knowledge and description of the elements of climate, of landforms, of soils, etc., but a field devoted to a systematic integration of geographic facts and principles on a regional basis to elucidate human problems the world over.

If our democratic way of life is to be preserved and made more secure in the future, then our whole educational program needs to be revamped to generate a true geographic perspective of regional and racial relations of all mankind.



A close-up view of one of the map studies. It illustrates the importance of selecting the proper map projection to represent the correct relative position of areas to sea routes.

THE POWER OF JAPAN AND CHINA: A STUDY IN POLITICAL GEOGRAPHY

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As Europe stands balanced between peace and war, warnings are being heard repeatedly of an approaching conflict in the Orient also, quite as vital to almost twice as many people. Some writers predict that this struggle in the East, between China and Japan, will be a military one—soon, short, and decisive—in favor of Japan. Others think that the struggle will be long and the outcome doubtful. Many current opinions as to the power of either nation lack soundness in the fact that they consider only the actual and visible achievements of the people, and ignore or minimize fundamental economic-geographic conditions. If, however, geography plays

time-keeper for a race between what seem to be the hare and the tortoise of the Orient, which may we expect to be the victor there, and what will its victory be worth to it among the greater powers of the world?

In the eighty or so years since the Western world pierced Eastern isolation, the entire social and economic structure of Japan has been profoundly shaken; and the coastal areas of its larger neighbor have likewise been materially affected. This invasion of Westernism has brought with it the desire of one, if not both, of the nations to emulate the great powers of the world. In pursuit of such ambitions recent events have shown Japan in the rôle of parasite determinedly laying hold on the land and feeding upon the resources of a great phlegmatic China. Whether it will, in the end, devour its elephantine prey or digest it with any degree of ease is still conjectural. It may be possible, however, to predict the outcome thru an examination of some of the factors which serve as fundamental bases for the rise of any nation to permanent world power.

SUPPORTING THE PEOPLE

At present, the most acute problem for both Japan and China is the necessity of caring for already dense populations which are increasing with startling rapidity, one million annually in Japan and over one half million in China. China has an area of 2,600,000 square miles and a population of about 457 million, as contrasted with Japan's area of 260,000 square miles and 83.5 million people.[1] China is, therefore, approximately ten times the size of Japan and has five and one-half times as many people. China's 175 people per square mile and Japan's 320 would indicate that China is much less densely populated. But, in reality, only the seventeen eastern provinces make up what may be considered to be China, for the western half of the country's territory is so non-productive, sparsely settled, and isolated that it has little or no importance in the nation. If only this eastern area is considered, then China is four and one-half times as large as Japan, has five times as many people, and

[1] Thruout this study, China is limited to China Proper (excluding Farther Tibet and Outer Mongolia); and Japan includes only Japan Proper, Chosen, and Taiwan. The debatable territories of both Jehol and Manchukuo have been omitted from both countries.

Discrepancies in figures may be due to the necessity for using many different sources, both official and unofficial. Caution is necessary in the use of any figures for Oriental countries, especially for China where many statistics are only estimates.

the density of population slightly exceeds that of Japan. Densities in the two nations compare favorably with those in other countries, such as Italy and Germany, which have 356 and 364 respectively. However, the severe pressure of people on the supporting capacity of the land is shown by the fact that China must feed 1,813 people per cultivated square mile; and Japan, 2,072. In contrast, France has 827 persons per cultivated square mile and Germany approximately 850. This excess of population will likely increase with the coming of Western ideas of lower death rates, unless birth control can be exercised also, and several factors, such as religion, insurance of support in old age, early marriages, and concubinage point to a continued increase in the birth rate. Altho China seems slightly better off than Japan both in density and rate of increase (floods, famines, droughts, and disease are contributing factors), both countries have a population burden to overcome which cannot be ignored if they are to compete effectively with other great powers.

With such an enormous population pressure Japan and China are both searching for possible ways to increase the supporting capacity of the land. The heavy population of the past has already caused almost all available land to be put into use. This is shown in Japan partly by the fact that in 1909 the percentage of cultivated land to uncultivated was 14.6; with the next decade it had increased only 1 per cent; and in the 1920's the increase was virtually at a standstill. On Japan's island of Hokkaido there is perhaps room for two million more people, but the more severe climatic environment tends to discourage settlement there. Colonization on a large scale in the much advertized Manchukuo is seen to be an improbable, and under present financial conditions an impossible, task.

In China, also, the utilization of available land for cultivation has been pushed to the limit. Improved methods of cultivation, flood control, dry farming, and the value to be found in new foods, such as potatoes, corn, and fruit and nut trees, may relieve China's farm problems slightly; but such relief seems small when it is observed that the farms average not more than two to five acres at present. The average is 30 in France and 160 in the United States.

Food production in eastern China and in Japan is not greatly restricted by climate, for the diversity and range of temperatures and rainfall in the former and the modified continental climate of the latter make it possible to produce a range of crops from sub-

tropical, such as rice and sugar, to north temperate, such as wheat, beans, and oats. The chief difficulty, then, is one of available land, for the topography of the two countries greatly limits areas where profitable crop production may be carried on. Thus each lacks a "margin of livelihood," and the heavy importation of foodstuffs is an indication of the impossibility of any reserve supply of foods in case of conflict.

THE TURN TO INDUSTRY

Impelled by the ever-increasing population and led on by a dream of world power, Japan entered upon an era of industrialization about 1859. It was shortly after this date, when 6,000 spindles were introduced into the country, that Japan seems to have first conceived the idea of becoming the "Britain of the East." Observing that Britain, also a small island empire, chiefly thru manufacturing as a basic industry, had attained first rank in the world, the ambitious Japanese apparently saw no reason why they too could not use the same means to accomplish as much. Thus in the last sixty years the greatest single aim of Japan has been a frenzy to realize power thru industrialization. The 85 per cent of the population engaged in agriculture and domestic handicraft in the eighteenth century has dropped to 51 per cent, and the 16 per cent living in towns of over 10,000 in 1894 had reached 32 per cent in 1920. During this period the number of factory workers increased at the rate of approximately 47,000 each year.

In striking contrast to Japan, China's growth in city workers has been neither so rapid nor so great. In cities such as Shanghai, Hankow, Tientsin, and Tsingtao it is just now emerging from its lethargy of domestic handicraft into modern industrial development. The percentage of farmers in China is decreasing but slowly, and few of the masses have thus far been affected by the coming of manufactures. It is quite probable, however, that here, as in Japan, future industrialization and its attendant occupations will do much to help care for China's population problems.

THE DEVELOPMENT OF MANUFACTURING

The leading manufactures of both countries are in the field of textiles, but the cotton spindles of Japan are more than double those of China, a country with five times as many people. While the number of spindles in the United Kingdom, the United States,

and Germany far exceed those in Japan, it is significant to note that they all have less than they did twenty years ago and that Japan has four times as many as it did in 1916. Japan now employs 998,631 workers in its textile mills. Such impressive figures, nevertheless, are but a small measure of Japan's actual position as far as its ambition to become a world industrial power is concerned, as is shown by these considerations:

First, Japan is still far outranked by some of the other great nations, such as Germany, whose population is similar but whose factories exceed Japan's by 1,836,100 and employ almost five times as many workers. Despite the fact that Japan has boomed and advertized its industries, it remains chiefly an agricultural nation. Witness the 10 percent of the population employed in manufacturing in Japan as opposed to the 40 per cent in the United Kingdom. In Italy, where 47 per cent in agriculture approaches the percentage of farmers in Japan, the percentage employed in manufacturing is almost three times as great. Too, the personnel of Japanese factory workers differs from that of the great powers. Where Japan has slightly more women than men in all factories (indicating light types of fabrication with a fluctuating payroll), the United Kingdom has almost three times as many men as women, and the United States six times.

Second, those who emphasize the rapid accomplishments of Japan in industry often fail to take cognizance of the fact that the government has borrowed heavily in order to encourage manufacturing thru aid, and that as a result a very few capitalists are growing wealthy at the expense of a paternalistic government while the development of business initiative among the masses moves ahead only slowly. Basic industries, such as iron works and railroads, are often subsidized by government funds and textile factories have developed with the use of machinery from abroad.

Third, the greatest single weakness of any dream of Japan to become a second Britain lies in the paucity of the basic resources. It is in this last consideration that the dormant possibilities of China dwarf those of Japan.

If the Japanese Empire rises to permanent world power thru the development of its industries, it will present a most remarkable anomaly to other great nations, for it possesses an alarming inadequacy of raw materials, and is poor in iron to construct and the power to drive machinery.

The most important single fabricated product is cotton goods, yet Japan must import almost the entire supply of raw cotton from China, India, Egypt, and the United States. Japan can produce cotton but the pressure of population makes it necessary to give the land over to food production instead. Japan has thus far been China's chief fabricator, serving as its best customer for raw cotton and yarn, and supplying it in return with cotton goods. Since the introduction of large scale manufacturing into China, however, Japan's lucrative trade there may be reduced.

The growth of iron and steel manufactures from 69 thousand tons in 1913 to almost 7.5 million tons in 1935 (production more than

doubled between 1933 and 1935) would seem to show Japan to be a coming Britain. But, unlike Britain (and this very difference is one of the most potent obstacles to its rise), Japan has little coal, the coal it has is of poor coking quality, and its iron ore is inferior. Perhaps, in no other industry has Japan so brilliantly succeeded in deceiving the world as in its power to produce iron and steel. Other nations may feel alarm when they learn that Japan supplies itself with 80 per cent of its steel demand; but this alarm is lessened somewhat when they learn that it produces only 63 per cent of its pig iron; and it subsides altogether with the knowledge that it can furnish but 9 per cent of its iron ore demand. Thus Japan, in order to produce pig iron and steel, is importing 91 per cent of the raw materials either in the form of ore or scrap and wrought iron. In 1934 its imports ranking third, fifth, and seventh in value were wrought iron, mineral oil, and coal respectively. The possibility of hydroelectric power, in a country of good rainfall and rugged land, is apparent. But of the potential 8,600,000 horsepower it has already developed 4,200,000 horsepower, so that development to the limit will still be insufficient.

Sarp has estimated the oil reserves of Japan at 1,235 million barrels, a quantity that would last the United States just 1.5 years at its present rate of production. Of Japan's present consumption of 280 million gallons annually it supplies only 23 per cent itself. Only one mineral, copper, does it produce in larger quantities than it needs, and in the extraction of this it usually ranks fourth in the world. The paucity of mineral resources in general is indicated by the small number of miners employed—in 1932, 185,840 as against 442,583 in Germany, and 809,475 in the United States.

The present inferiority of China's position to that of Japan is evident, and it is with just trepidations that it eyes its tiny rival. While China has only one-half as many cotton spindles and one-third as many textile workers as Japan, the number has increased almost five times in the last thirty years. At the same time, its increasing domestic industry in competition with Japan is illustrated by the decrease in the value of cotton piece goods entering China since 1931, from $36,507,000 in that year to $24,652,000 in 1932, $10,605.000 in 1933, and only $4,890,000 in 1934. The extent of Japan's investment in Chinese industries, however, is seen in the ownership by Japanese of 41 of the 133 cotton mills of 1933.

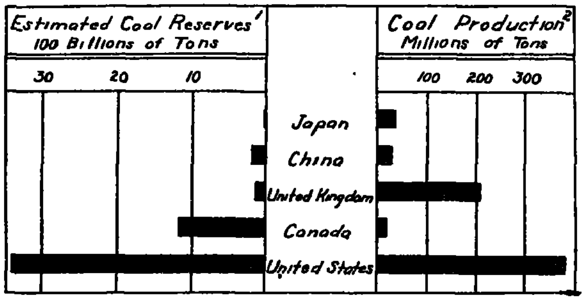

FIG. 1. Coal reserves and production for five selected countries. Orchard estimates China's reserves at 2,211 tons per capita, those of the United States at 27,000, the United Kingdom, 4,070, and Germany, 3,921. (John E. Orchard, *Japan's Economic Position,* 281)

It is in the raw materials with which to continue production that China far outstrips its rival. It produces 2,000 times as much cotton as Japan, ranking next to the United States and India, while Japan is surpassed only by the United States and the United Kingdom in the amount of raw cotton consumed. China ranks fourth in the world in reserves (actual and probable) of coal, despite the fact that it has, thus far, taken little advantage of these fields. With more coal than the United Kingdom in reserve it produces less than Japan; and the United States produces, in one year, more coal than the Japanese Empire has within its borders. At present most of China's coal *mines* are in Manchukuo and Jehol, now effectively alienated, but the major part of the *reserves* still lie within its own provinces. Greater production in the latter area will be encouraged by future industrial development, but must await capital, stability of government, and better transportation facilities. An indication of the growing uses for coal is seen in the fact that in 1933 it mined more coal than in 1932, yet exported just one-fourth as much. In the same year it imported three times as much coal as was exported.

In the location of its iron deposits of one billion tons China is not so fortunate, for almost three-fourths are found in Manchukuo. Here again the influence of Japan is shown by the fact that it controls, financially at least, 90 per cent of China's iron ore deposits.

[1] Statesman's Yearbook, 1935; Foreign Commerce Yearbook, 1935. Figures for 1933 or 1934.

[2] H. M. Hoar. The Coal Industry of the World, United States Department of Commerce Trade Promotion Series, No. 105. Actual and probable coal, including brown coal.

Of the 250 million tons remaining in the eastern provinces, production in 1933 was only 2.5 million tons (over 13 million in the United States, 6 in Britain, and almost 2 in Japan), and one-third of this was exported to Japan as ore.

China annually produces about 60 per cent of the world's antimony and one-half of its tungsten. Tin is an important export and lead, manganese, and zinc are known to exist in quantities sufficient for profitable extraction some day. In minerals China has a good supply for use in its own industries for years to come; whether the resources are sufficient to place it on a par, for example, with the United States is extremely doubtful.

Japan has already attained a place far in advance of its neighbor's. The formidableness of its position, however, diminishes when its deficiencies in raw materials and minerals are realized. Japan proudly blows the blasts from its industrial whistles, but so long as the present limits of the Empire remain it may strive in vain to achieve permanent front rank in industry and in world power. And what of China? Tho it has been slow to waken, if it is allowed to rise unhindered does geography so clearly mark its limit as it does Japan's? The possibilities for future industrial development, even if only to serve a vast home market of 400 million cannot be denied, and China has ample coal to fabricate its own supplies of minerals and agricultural products; but if it hopes to industrialize as Britain, Germany, and the United States have industrialized, it will find that its coal and iron are of lamentably inferior grade. It will, no doubt, develop manufacturing greatly at some places in the next few decades, but the scarcity of such things as copper, petroleum, and timber will always prove to be limitations. It is important to note that with the alternative of industrialization to help care for the population burden, its former self-sufficiency is breaking down. And across the Yellow Sea, Japan's lack of national sustenance, in a manufacturing regime, increases with the construction of each factory.

TRADING ABROAD

The character and amount of foreign trade for both Japan and China reveal weaknesses also which must become obstacles to para-

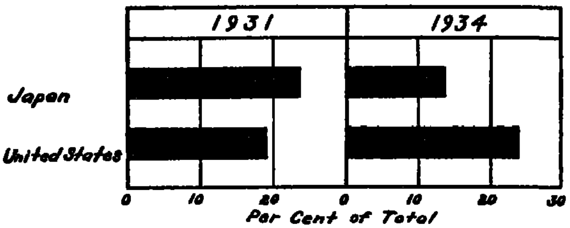

FIG. 2. Percentage of foreign trade of China with its two chief traders.

mount world positions. Here again Japan's accomplished development is greater than China's, for its foreign trade in 1933 was $2,200,000,000 and that of China was only $1,600,000,000. Between 1929 and 1934 six of Japan's most important exports showed an average gain of 383 per cent and the total exports since 1931 have doubled. An even greater difference is shown in the per capita foreign trade: in 1934 China imported $.47 per capita and exported $.24 and Japan imported $5.93 per capita and exported $5.56. But per capita import and export trade does not necessarily insure world power, for Canada's is $28.60 and $36.70 and Switzerland's is $65.80 and $38.30; and these two are and will remain less than first rate nations. A world economic boycott against Japan could prove to be a most effective weapon, as was shown by the effect of China's boycott after the 1931 invasion of Manchuria (Fig. 2). Since China is one of the greatest customers of Japan's factories the need for China's good will is evident. With each Nippon advance into China's territory the more precarious becomes Japan's hold on China's trade.

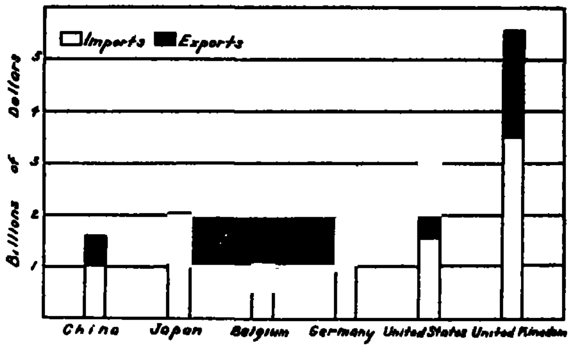

FIG. 3. Foreign trade of six selected countries in 1934.

The character of the trade of Japan is shown in Fig. 4. It is a heavy importer of raw materials and foodstuffs and an exporter of manufactured articles. Besides this it has a slightly unfavorable balance of trade, tho not as unfavorable as that of China. In time of war a block in the sources of raw materials would mean the collapse of its greatest industries; in time of peace, it must maintain a greater balance between industrial consumption and indus-

trial export. Britain has an even more unfavorable balance of trade, but the things which compensate for it, such as the carrying trade, foreign investments, and tourists, far exceed similar compensations for Japan.

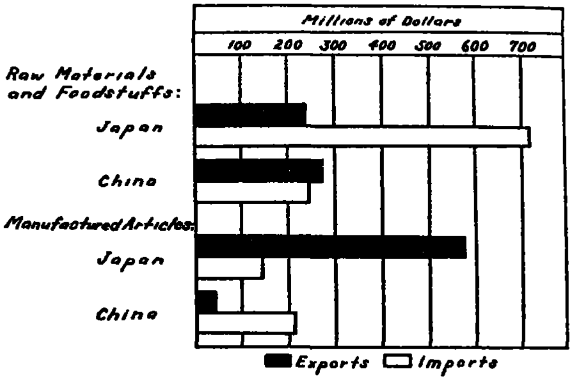

FIG. 4. Character of foreign trade in 1934. Calculated for leading items only.

In contrast to Japan, China's greatest imports are in the field of manufactures. Its problem, if it progresses toward some degree of world power, is to cut down the importation of fabricated articles by producing enough for home consumption. That this is possible has been shown, but the question as to how to pay for the increasing amount of food which must be imported is still a serious one.

CONCLUSIONS

In the light of the foregoing considerations three things seem evident: (1) that Japan, at present, far exceeds China in actual progress, industrial development, and international prestige; (2) that China possesses a sound geographical basis on which to rise, ultimately, to a place above Japan in the Orient; and (3) that it is probable that neither country, now nor in the future, will equal such nations as the United States, Germany, or Britain in permanent world power. The first conclusion is emphasized by many students of world problems and is the idea running thru most articles dealing with the two Oriental countries; the full import of the second and third is realized by few. If stability of government in China should ever make possible its actual emergence, and there are signs that this is happening, the hegemony of Japan in the Orient will be challenged and China's fear of the Nippon empire may indeed become chimerical.

For figures and data, the author is indebted particularly to the following sources:

1. The United States Department of Commerce, Foreign Commerce Yearbook
2. Statesman's Yearbook
3. China Year Book

4. Japan Year Book
5. Joseph Barnes. Empire in the East
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THE STRUGGLE FOR NATURAL RESOURCES AS A CAUSE OF THE EUROPEAN WAR*

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One of the pertinent questions before the world today is that pertaining to the cause or causes of the European War. An amazed world is asking why. Two decades ago our country placed 4,000,000 men under arms and transported 2,000,000 of them across to Europe to fight a war to end war. Today, when the eldest sons of the veterans of that war are barely of military age, we find Europe again engaged in a similar struggle. It is only by attempting to understand the causes of such recurring wars that we are able to act intelligently toward the present situation.

While there is no single cause for the present European War, this discussion deals only with the struggle of the nations to secure natural resources. Other factors causing the war can not be ignored, but space does not permit their consideration here. The evils of the Versailles Treaty as the cause of the present situation can not be neglected. Differences in race, language, and religion, the conflicts of differing economic and social orders, and contrasting political systems must always enter into any evaluation. Bungled diplomacy, the personal ambition of rulers and dictators, and perhaps others may be important or contributory causes of the present European War. Some of these are contingent upon and have developed out of the struggle for natural resources.

Natural resources are given by nature. They are permanent in location and can not be changed. Moreover, they are basic in the

* This paper was written in April, 1940. Subsequent events have changed the line-up of several nations, but the struggle to control these essential minerals continues. A good question for your class is: How vigorous a war can Italy wage without opening the Mediterranean to the oceans? Editor.

development of nations, and no nation and no people can make great progress without possession of or access to the world's resources upon which life and progress are dependent.

The natural resources of the world may be divided into five large groups. The most important of these is land, especially soil. In the present world, minerals are almost co-equal with soil in importance as a basis of modern civilization. The third resource is that of water, both inland and oceanic waters. Of less relative importance are forests and wild life. Since these last two have not been important causes of wars in the past, since they do not enter actively into the present situation, and are not likely to be pertinent causes of wars in the future, they may be dismissed from further consideration in a topic dealing with the competition for natural resources as a cause of the present European War.

MINERALS

Our modern power and mechanical civilization is built upon minerals. They are especially important as a cause of controversies and wars between peoples and nations because they are very much concentrated. A small area of land, because it contains minerals, may be vastly more important than a much larger area of non-mineral lands. One area of Europe about the size of New Hampshire contains 60 per cent of the good coal of Europe and in normal times produces 60 per cent of the iron and steel of that continent. C. K. Leith is authority for the statement that the United States and the British Commonwealth of Nations control three-fourths of the world's mineral production and reserves.[1] Great responsibility rests upon these nations or upon any nation that assumes control of such a large percentage of a basic resource.

COAL

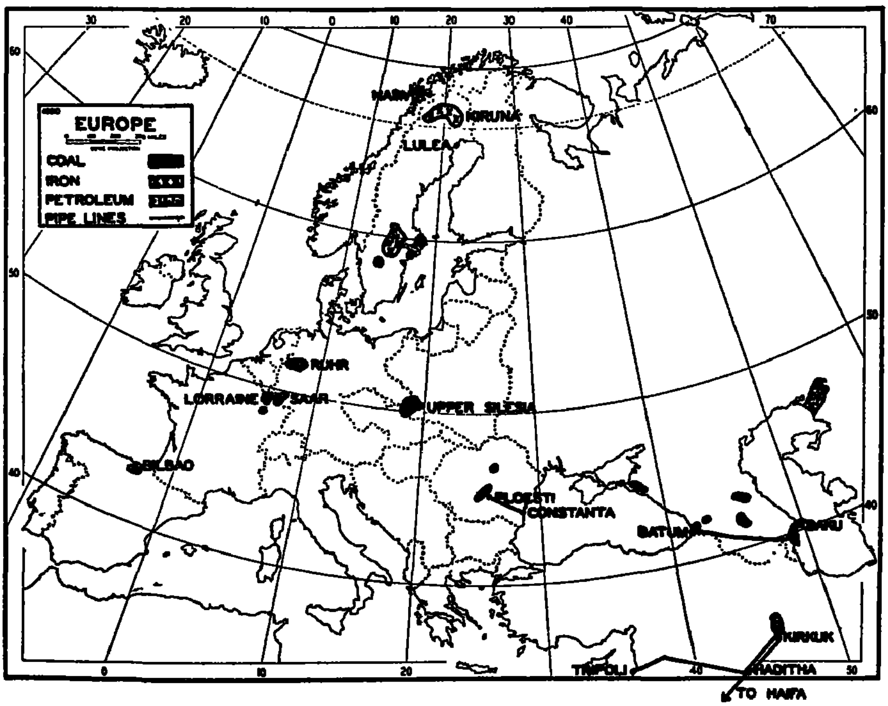
Coal and iron are the industrial twins of modern economic life. The Germans are responsible for the statement that "Iron is war gold." As an illustration of the struggle for minerals let us turn to the Upper Silesian coal field located at the junction of Germany, Poland, and Czechoslovakia.[2] Prior to the World War this highly mineralized region was controlled entirely by Germany. The district contains not only rich coal of the coking variety, but also im-

[1] *World Minerals and World Politics*, p. 15. Whittlesey House, McGraw Hill, 1931.

[2] The discussion here assumes the old boundaries because no others are yet accepted by the world.

portant deposits of iron, lead, and zinc. At the close of the World War, following a plebiscite, this Basin was divided, Germany getting less than half of the minerals, and Poland getting a somewhat larger share, with a small slice going to Czechoslovakia. Following the invasion of Czechoslovakia and Poland by Germany this entire mineralized district is again under German control. It was one of the things that Hitler wanted when his armies overran Czechoslovakia and invaded Poland. When this war ends the Upper Silesian Basin will again be a bone of contention, especially if Poland and Czechoslovakia are reconstituted.

Diagonally across Germany in the northwest portion of the country lies Europe's richest coal field. The Ruhr Coal Field contains 60 per cent of the good coal of Europe. It lies just east of the Rhine and a short distance from the French and Belgian boundaries. The greatest industrial region of Germany has developed upon it. In this 2,000 to 3,000 square miles are concentrated many



Sketch map of Europe showing location of certain mineral deposits

of the large industrial cities of Germany, manufacturing iron and

steel, cotton, woolens, chemicals, munitions, and a multitude of other commodities.

IRON

After Germany secured the Lorraine iron fields about 75 to 100 miles to the southwest of the Ruhr at the close of the Franco-Prussian War, it supplied most of the iron for the blast furnaces of the Ruhr from these fields. During much of the time prior to 1914 it produced over 90 per cent of its needs for iron largely from this source. After 1871 it became one of the avowed intentions of France to recapture the Lorraine iron fields which had been lost to Germany. That was one of the major objectives of France in the World War of 1914-1918. When France emerged a victor in that struggle, it demanded and received German Lorraine with its iron ore. These deposits, together with those in the French portion of Lorraine, make up not only the greatest iron ore deposit in Europe but one of the very large reserves of the world. The iron ores are hematite running about 33 per cent metallic iron. They are also high in sulphur and phosphorus which makes them difficult to smelt. However, Germany had invented ways of smelting the ores and was using them for most of its iron ore supply. We now have the unusual situation of Europe's richest coal field just east of the French-German boundary and the richest iron ore deposit just west of the same boundary. The successful utilization of these two great resources is mutually interdependent the one upon the other, but they are separated by a political boundary line between two hostile nations which prevents their free interchange. Since 1918 Germany and France have made various agreements concerning the exchange of these minerals; but neither nation has any desire to become dependent upon the other, because war might interfere with the flow of such essential commodities.

Consequently, Germany has turned to other sources of iron ore. It supported the Franco party in Spain, and following the close of that conflict imported the Basque ores from northern Spain, which prior to that time had supplied about 26 per cent of the British needs. Britain, shut off from the Spanish ores, turned to the high grade ores of Sweden where Germany was already taking eight to nine million tons. Much of the rich Swedish magnetite ores carrying as high as 60 per cent metallic iron are located at Kiruna and Gellivari beyond the Arctic Circle. Sweden had placed a limit of

10.5 million tons upon its export of ore from these fields. With the demands made by Germany plus the new demands made by Britain, Sweden was unable to supply both countries. It had three alternatives. Supply Germany and refuse Britain and thereby lose a good neighbor. Supply Britain's demand and cut down Germany's quota and thereby secure the enmity of Germany. It accepted the third alternative, which was to raise its export quota to 12.7 million tons and supply the demands of both nations.

Sweden is thus in a peculiar situation. It has the richest resources of high grade ore in Europe, but does not have coal to smelt it. It, therefore, naturally moves to the nations with coal, particularly Germany and Britain. These nations insist upon their demands being met and Sweden is afraid to displease either. Someone has compared Sweden's position to that of a rich man counting his treasure while a gang of desperadoes look on. Poor Sweden is never certain when some desperado may try to take its treasure.

The April invasion of Norway by Germany is an attempt to guarantee the flow of the Swedish ore to Germany. The landing of troops at Narvik had a two-fold objective: first, to place the German army in striking distance of the iron mines located about 100 miles inland and connected by rail with Narvik and, secondly, to cut off the flow of the Swedish iron ore from Britain. Narvik is the winter route by which the iron ore reaches markets when the Baltic is frozen. That Sweden can maintain its neutrality in the face of the demands of its two powerful neighbors seems doubtful. With the coming of spring the summer route to Germany via Lulea and the Baltic will be available to that country. This fact may lessen the pressure upon Sweden until winter again closes this route.

PETROLEUM

A third mineral which has been the source of much competition in Europe as well as the other parts of the world is petroleum. No nation of Western Europe has large supplies of petroleum. There are two large reserves of petroleum in Europe. One is the Rumanian field along the east and north flanks of the Carpathian Mountains, and the other is the Russian supply on the western side of the Caspian Sea and on the north and south sides of the Caucasus Mountains. It is upon these two sources that both Germany and Russia must depend for their supply of petroleum during war time.

South from the Caspian Sea running thru Iran and Iraq to the

head of the Persian Gulf are large reserves of petroleum. Several concessions have been secured, numerous explorations have been made, and some production has resulted. Pipe lines from Kirkuk along the upper Tigris have been built with termini at Haifi and Tripoli. There are two possibilities of war in these areas to secure control of these supplies, and thus handicap competing nations. It is rumored that France and Britain may break with Russia and, in joint action with Turkey, attack Russia in the Black Sea Region, capture the oil port of Batum, and drive north and occupy the oil fields of the Caucasus. Such a seizure would be serious to both Germany and Russia. The other possibility is that a combined German and Russian army might drive southeast toward the Persian Gulf and capture the Kirkuk and Iranian oil fields and thus handicap Britain and France in their supply of petroleum for ships in the Mediterranean Sea and the Indian Ocean. Either one of these contingencies would be serious if successful.

The most recent attempt to control petroleum supplies is now aimed at Rumania. It appears that Germany is disappointed in the amount of petroleum supplied from Russia. Apparently Russia's transportation system is inadequate to move surplus petroleum stocks from the Caucasus to Germany. Hence Germany is making a drive to secure the oil of the nearer Rumanian fields. It says these are essential to its existence. Much of the petroleum of Rumania is produced with French and British capital and by companies from these countries. These companies and Britain and France oppose the forced sale of Rumanian oil to Germany, and the allied governments threaten armed intervention if Rumania forces the sale of this oil to Germany.

From these few illustrations it is evident that one of the chief causes of competition among the nations of Europe is for control of these basic minerals. Space does not permit a consideration of various other minerals, for which keen competition prevails. These include, copper, tin, bauxite, vanadium, tungsten, chromium, and others. Never before in the history of the world has there been such a searching-out for essential mineral reserves. The World War of 1914-1918 made evident the tremendous advantages of a nation controlling mineral supplies.

Economic self-sufficiency of mineral supplies is impossible for any nation in the present-day world. Such an attainment would be unfortunate if possible, because a nation thus endowed might be-

come a menace to the rest of the world. There are enough minerals in the world for all nations to have all they need. Freedom of international trade will assure an adequate supply for all.

As a cause of past wars, an important factor in the present war, minerals continue to be possible causes of future wars. Only by some arrangement guaranteeing to all nations a necessary share either by possession or by trade can hope of peace be assured.

STRUGGLE FOR LAND RESOURCES AS A CAUSE OF THE EUROPEAN WAR

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The September issue of the JOURNAL carried a discussion upon the competition by the nations of the world for minerals as one of the important causes of the present European War. As stated in that article, the consideration of natural resources as a cause of war is always to be thought of, not as a complete cause, but as one of several important causes.

LAND AS A RESOURCE

The second resource to be considered is that of land, especially soil. This is man's most basic resource, and one for which individuals and nations have competed thruout the history of the world. It has been an important cause of past wars, enters actively in the present world situation, and directly and indirectly will be a potent cause of future wars.

Land area is important. If a nation is to have strength and power there must be sufficient area upon which a people may dwell, and from which it may gain food for a large part of its subsistence. But area alone does not make a nation. In recent years Germany has added to its area Bohemia, Moravia, Slovakia, part of Poland, and other regions. The total area is sometimes referred to as Greater Germany. This is a misnomer because these areas of unlike peoples and cultures held together by an autocratic government with a common color upon the map do not make a true nation. A nation is something more basic. It is a group of people living usually in a contiguous area, and having a similarity in institutions such as language, race, religion, and culture—in short, a similar way of life. Present Greater Germany does not measure up to this standard.

POPULATION DENSITIES

As population densities become greater there is a keener competition for land. Practically all of Western Europe has a density of population far exceeding the average for the earth. Every scrap of land capable of supporting people has been taken over by some nation. Possession of land in that part of the world is an acute problem. Shiftings of international boundaries are important in giving to or taking from nations even small areas of land. Boundary disputes there are vitally different from that of the new world. In most of the new world population densities are so low that the inclusion or exclusion of a given area of land from a nation is not vitally significant. It is not serious in terms of the production of essential food or other basic raw materials. We, in this part of the world where land is so plentiful, have criticized the nations of Europe for their competition for even small areas of land. In our assumed wisdom, born largely of lack of understanding, we assert too vigorously to the nations of Europe that such troubles are unnecessary, and point with pride to the three thousand miles of undefended boundary between the United States and Canada. In this part of the world we have had such an abundance of land and the other good things that man needs, that we have never known what it is to compete for land as a life and death proposition. It is hardly in good taste for us to criticize too severely nations of Western Europe in this respect.

When is a nation fully populated is a pertinent question at this point. Is the land in Western Europe, particularly Germany, fully populated? Germany has a population of 346 per square mile; Belgium has 677; and United Kingdom nearly 500. Hence, Germany is not the most densely populated land of Western Europe. The Nile Valley supports, on an agricultural basis, 1,100 people per square mile, and certain portions of Japan are believed to support as many as 2,200 per cultivated square mile with a very low standard of living.

LEBENSRAUM IN GERMANY

Hitler cries Lebensraum, living space. In *Mein Kampf,* he declares it necessary that Germany must have additional living space and hence that it must expand. In any fair analysis of this claim, it must be remembered that many of Germany's lands are not rich. Much of the country is made up of sandy plains which are valuable

chiefly for the production of potatoes and rye. The glacier-deposited sandy soil with large moraines extending east-west across the German plain. Much of southern Germany occupies the rough lands of the Alpine Foreland, while other mountain groups cover considerable areas elsewhere. Approximately one-fourth of Germany is in forests made up chiefly of the rougher lands, having low agricultural productivity.

If Germany is to expand to secure new food producing areas, as Hitler claims it must, we may well ask the question: Where? The lands lying adjacent to Germany are almost as densely populated as Germany and most of them have no surplus of food, or at best, only a small quantity. The only two lands of Europe having a large food surplus are the Danube Valley made up of parts of Hungary, Rumania, and smaller portions of Jugoslavia and Bulgaria; and, secondly, the Ukraine or the Black Earth area of southern Russia. It is into these areas that Hitler in *Mein Kampf* asserts that Germany must expand. Such expansion necessitates the crossing of many miles of land now occupied by other nations, and the taking of these surplus food producing lands also owned by other nations. Any such expansion must mean trouble and perhaps war as an ultimate consequence.

ITALY AND LIVING SPACE

Italy also is a poor country. A large proportion of the area is mountainous, and the climate is characterized by summer drought, which limits greatly the productiveness of the land. It is with difficulty that Italy produces enough wheat for bread. By irrigation in some areas, by draining swamps in others, and by the utilization of every available patch of ground Mussolini has made it possible for Italy to supply enough wheat for bread during years when the seasons are favorable. In poor crop years wheat must be imported despite these strenuous endeavors. The country has few minerals and the basic industrial minerals are almost entirely absent. Mussolini also says that Italy must expand. If so, where? It might be Tunisia, but most of that land is desert. It might be expansion into the Balkans which have some surplus food, but this land is owned by independent peoples who will fight to retain possession of it. Regardless of the direction in which Mussolini attempts to expand, he meets with the ownership of land by other nations. To occupy it and add it to Italy means war.

THE COLONIAL QUESTION

Closely associated with the struggle to control land areas in Europe is the control of unoccupied or sparsely settled lands in other parts of the world, chiefly in the tropics. This is the much discussed colonial problem. It resembles in many ways the problem of ownership of land in Europe, because it seeks to control lands in order to supply certain nations of Europe with raw materials for manufacture or for food.

Some of the nations of the world, such as Britain, France, Belgium, and Holland, have large colonial empires and have prospered greatly, partly from these colonies. It has come to be regarded by many people that a colonial empire is synonymous with the prosperity of the nation controlling the colonies. In recent years there has been a decided opinion that this may not be true, and a considerable body of literature has appeared questioning the value of colonial conquests and possessions. Several of these writers purport to show statistically and otherwise that many colonies cost more in conquest and in expense of administration than they yield in economic returns. In other words, people are questioning whether colonies are worth the price of conquest and subsequent administration, development, and protection.

It would appear that a colony can be profitable to the mother country in two ways. First, native labor may be exploited and compelled to work and produce goods at a very low cost. This might enable the country owning the colony to sell goods thus produced in the markets of the world at a cost which would return a substantial profit. Secondly, a nation may control the industry and trade of a colony. The prices for certain raw materials to other people may be fixed arbitrarily at high levels and thus yield handsome returns. If native labor is not exploited, and if the trade and commerce of the colonial areas are open on equal terms to all people, it is difficult to see a great advantage in political control of such areas by outside nations. The United States' contention for the Open Door in China is an illustration of the kind of commerce and trade here advocated. If a similar open door prevailed thruout the world permitting all nations to trade on terms of equality, the gains from colonial conquests would largely disappear.

Man does not live by bread alone, but he must have bread to live. Bread is a product of the land. To have bread, man must have land or be able to buy from peoples who have land. To buy, he must be

able to exchange his products for those of another people. All the earth is not equally productive nor can it furnish the same kind of products to its owners. The good lands of the earth are already possessed, and wars are bound to come if one nation or one people tries to dispossess another. Hence, if wars are to be avoided the good lands of the earth must be divided among the peoples of the world, or their products must be made available to all peoples. Only by the evening influences of free interchange of products of the land can the competition of peoples be satisfied and some measure of peace be assured.

THE STRUGGLE FOR WATER RESOURCES AS A CAUSE OF THE EUROPEAN WAR

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Previous articles in this series have dealt with the competition of nations for minerals and land as contributory causes of the European War. This third discussion deals with the struggle for waters, both inland and oceanic, as a cause of the present war.

INLAND WATERS

Inland waters have been a less potent cause of war than oceanic waters, altho they have entered in an important way into international disputes and into the formulation of peace treaties. Following the World War the more important navigable streams of western Europe, such as the Rhine, Elbe, Vistula, and the Danube, were internationalized. This was done in order that all nations fronting upon these rivers might have unrestricted use of their navigable waters and secure an outlet thru them to the sea. This provision was especially important to those nations in the heart of Europe without ocean frontage.

Germany's most important commercial river is the Rhine. It is one of the ironies of the nationalistic system of Europe that both the source and the mouth of the river are controlled by other nations. Germany has long felt handicapped by this situation and built the Ems Canal to divert the traffic from the Ruhr region northward to Emden, a German port. The project met with little success, however, and most of the traffic originating on the Rhine or moving into that region from the North Sea continues to pass thru Holland and Belgium.

OCEAN FRONTAGE

The importance of ocean frontage to a nation can not be overemphasized. No powerful nation in the world today is without access to the sea. A window upon the ocean makes accessible the markets of the world and gives the possibility of colonial ownership and development with the questionable features previously noted. It is a remarkable fact that in less than 500 years the institutions of western Europe have spread over the world. This is in large measure due to the energetic and progressive peoples who have occupied these lands; but it is also partially a result of the fact that all these nations had an ocean frontage which led them to the sea and to world commerce and world conquest, and thus to worldwide contacts and interests. From this ocean frontage with its excellent harbors and invitation to sea-faring life, their sailors found their way to the far reaches of the earth. No other progressive peoples of the world have such combined advantages of harbors, fisheries, accessibility to other lands, and the open sea as have the peoples of western Europe.

Following the World War the peace treaty of Versailles did a very unusual thing. In order to give Poland an outlet to the sea the Polish Corridor was formed dividing East Prussia from the rest of Germany. It is true that Poles make up a large element of the population which gave some basis for adding the area to Poland, but the main consideration appears to have been to give Poland an ocean frontage. A similar arrangement as a result of a war between the United States and Canada would give to a victorious Canada a corridor along the Mohawk-Hudson depression separating New England from the rest of the country and making New York an international port. We would hardly look upon such a scheme with approval, yet the Polish Corridor presents a somewhat analogous situation. Germany was forced to sign the treaty but has always stated that it is an impossible boundary, and that sooner or later it would be changed. It was partially to secure this change that Hitler moved into Poland. In fact, this was the pointed question which led to the invasion. No attempt is made here to excuse the German invasion of Poland, but rather to point out that the basis for that invasion was laid in the Treaty of Versailles in an attempt to give Poland ocean frontage.

RUSSIA AND WARM WATER

The situation of Russia is another interesting case in point. That nation with eight and one-half million square miles of terri-

tory is without a first class open port on warm water. It is a remarkable circumstance that such an area of land larger than North America has no good warm water port easily accessible from the interior. Since the time of Peter the Great, Russia has struggled to secure a satisfactory outlet to warm water. The Dardanelles has been one of its continued objectives, but it has been successfully frustrated by other nations from obtaining it. Leningrad and the Gulf of Finland give access to the Baltic which is frozen several months of the year, and whose outlet is controlled by other nations. Russia has been severely criticized for the recent absorption of the small Baltic nations, and the war with Finland was partially a result of its program to secure more ocean frontage. The world stands shocked at the overrunning of these small nations by a great and powerful nation like Russia. It remains true, however, that the Baltic ports are largely the outlet of much of Russia's territory. In fact it is in large measure Russia's hinterland that makes such ports as Riga, Libau, Revel, and other East Baltic ports prosperous. One can see why Russia would desire to secure the ports which serve as an outlet for its territory.

Russia has built a railroad from Leningrad thru the forests, marshes, and Arctic wastes to the Murmansk Coast. Due to the warm Gulf Stream Drift this coast is not frozen and permits shipment of products thruout the year. It is a very roundabout route, however, as most of Russia's surplus flax, timber, and grain are produced hundreds or even a thousand miles to the south.

Russia expanded eastward to warm water at Port Arthur opposite Japan. The Russo-Japanese War of 1905 brought an end to this expansion. Russia also threatens to expand southward to the Indian Ocean or the Persian Gulf into Iran, Afghanistan, or India. As long as Russia does not have an open water port and is denied this highly essential goal to the successful development of a nation, the world may expect continued agitation and unsettlement in the ownership and control of those areas that bar the Russian hinterland from its natural sea outlet.

BRITAIN

The significance of the ocean and surrounding water to Britain is so evident as scarcely to need discussion. The British democracy is in large measure an outgrowth of an insular land protected from outside invasion by the sea. The whole attitude of life in Britain is bound up with the sea and the traditions of the sea. Britain's very

life depends upon keeping the sea lanes open. That is the primary consideration of its foreign policy.

The British attitude of mind is well expressed by Kipling's poem addressed to the *Big Steamers*.

"Oh, where are you going to, all you Big Steamers,
With England's own coal, up and down the salt seas?"
"We are going to fetch you your bread and your butter,
Your beef, pork, and mutton, eggs, apples, and cheese."

"And where will you fetch it from, all you Big Steamers,
And where shall I write you when you are away?"
"We fetch it from Melbourne, Quebec, and Vancouver,
Address us at Hobart, Hong-Kong, and Bombay."

"For the bread that you eat and the biscuits you nibble,
The sweets that you suck and the joints that you carve,
They are brought to you daily by all us Big Steamers,
And if any one hinders our coming you'll starve!"

These are only a few illustrations of the importance of the sea and the way in which the control of outlets to the sea forms an important cause of modern war. Such illustrations can be multiplied almost without number. Only by giving a nation a window upon the sea or by guaranteeing to it an outlet in both peace or war can there be hope for a peaceful solution of this question.

ECONOMIC SELF-SUFFICIENCY

In concluding this brief statement a word should be said concerning the commonly discussed theory of national economic self-sufficiency. There is no such thing in this day. Such national economic independence must be based upon the control of natural resources. No nation in this modern world is self-sufficient and it is fortunate that this is true. The United States and Russia come nearest to meeting this standard. Notwithstanding the richness of our country and the variety of its products and resources, one study suggests that there are seventeen important items which we do not produce in sufficient quantities to meet our needs, and that ten of these may be regarded as essential. In case of war the list is likely to expand greatly. It has been argued that we could use substitutes if necessary. That may be true in some measure, but it would be at great inconvenience and expense and would be impossible in some cases. Economic self-sufficiency of nations is undesirable even if possible. All nations can not attain that position and why should any nation desire it? The way to peace lies rather in

the economic interdependence of nations. That means the free interchange of commodities from those parts of the world possessing certain resources to those in need of them. It means the breaking down of tariff barriers and the guaranteeing of the unrestricted movement in either peace or war of resources and the products derived from them. It is only by some such a program that we can expect peace in the struggle for these resources.

IN CONCLUSION

This discussion has set forth some of the things for which nations fight. Resources are given by nature and man can not create them. National and individual life alike depend upon them and upon their use.

The outlook concerning the ownership and control of natural resources may appear gloomy. Doubtless complete freedom of interchange lies a long way in the future. It may be possible, however, that overdeveloped nationalism may diminish in the years ahead of us, that tariff barriers may be lowered, and other artificial restrictions may be removed in order that all people may benefit from the natural resources of this earth. The alternative would seem to be the control of the earth's essential resources by a few nations. Such control would be even less desirable than the present arrangement.

When this war ends, the disposition of these natural resources will again be an issue. It will be one of the crucial problems. Regardless of present or new boundaries, minerals, soil, water, forests will be desired by all peoples. The demand for these resources will be a continuing problem confronting the world and a continual challenge to the peoples of the world. May we hope that there will be some measure of justice in the division of these resources and a guarantee of free interchange of the products based upon them. Such a policy holds in it some assurance for a peaceful world.

THE BALKANS AS A WORLD PROBLEM

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In spite of the obscurity surrounding the underlying social realities of the Balkan Peninsula, we are definitely aware of its existence because its constant social conflicts make periodically the front pages of our newspaper. We must not fail to remember that six major wars have started in the Balkans in scarcely more than half a century. We must not forget that the conflagration of the World War flamed up there in 1914, that the control of the Balkans and of the Dardanelles was the primary object for which the Central Powers fought their losing battle during the World War, that thru the intervention of Turkey and Bulgaria the greatest war in history was prolonged; it must be added that it was in the Balkans that the victory of the Allied armies was earliest, and most decisively won. Even after the signing of the peace treaties, the problem of Turkey kept Europe agitated for four more years and the periodical difficulties arising from the exchanges of the populations have until very recently required the attention of statesmen and of the League of Nations. Nor is it yet a solution to view as settled for the whole problem of the Balkans is still a challenging one, and the efforts to provide the basis of lasting peace in the Balkans should deserve our most serious attention.

If we want to go a little more into the history, then let us recall that it was the Balkans that produced Alexander the Great; it was the Balkans that allured Christianity and its greatest statesman, Paul of Tarsus, across the Aegean, from Asia into Europe, and so altered the whole course of history. It was not by accident that the World War began there. Here was a spot where the Austro-Hungarian and German ambitions were being thwarted by the ever-growing power of the little Balkan nations—lying directly across the historical highway of Europe and Asia, with Istanbul, for its gate city. The Balkans was a barrier to the grandiose project of the Central powers.

If we are to give a sociological interpretation of the Balkans, let us, first of all, consider the geographic factor.

THE GEOGRAPHIC FACTOR

The Balkan Peninsula has served as a natural bridge for the surging waves of migratory movements between Europe and Asia,

with one thorofare joining Asia and Europe and another joining the Black Sea and the Mediterranean. Both by its geographical location and by topography the territory seems to have been predestined for conflict. By its location the Peninsula has been hauled and pulled between the social forces of the two continents. Altho a part of Europe, the physical relief of the area turns its back on Europe: all its rivers run to the East and South. It is a Peninsula cut across by hardly accessible mountain ranges, and as a whole, the whole region is considerably elevated above sea-level. Communication is, in modern terms, limited and unsatisfactory.

This is intensified by the fact that the northern section of the Balkan Peninsula is largely out of touch with the surrounding seas, not only because of its width but also on account of the nature of the shore-lines, and, in part, of the direction of the mountains. While the southern part of the Peninsula is accessible to sea-routes, the northern part is actually remote from them. This, in turn, promotes the centrifugal tendencies in the Peninsula. Thus the topographical structure of the region, as pointed out by Dr. Newbigin, is such that there is "no natural centre about which a great state might crystallize, and, further, that the existence of two, broad, diverging lines of communication, running respectively north to south and north-west to south-east, facilitates the entrance of alien peoples, and makes the establishment of even small states difficult. There is no natural rallying point. . . . The valleys are but drowned river valleys. There is no natural line of separation from the plains of Central Europe. The inhabitants have been unable to utilize the natural advantages of the plains partly because the whole region lies open to invasion alike from north and from south." In fact, no mountain barrier separates the Peninsula from the Continental mainland, as Italy is separted by the Alps and the Iberian Peninsula by the Pyrenees. Thus there is no real separation between the Balkan Peninsula and Central Europe. This physical continuity is accentuated by the notable increase in width of the Peninsula towards the north. Consequently it is nearly impossible to draw a geographically satisfactory frontier in this section; this fact also explains frequent contests for borderlines among the Balkan states and their neighbors.

This geographical accessibility from Asia and Europe indicates why rival cultures, institutions, religions and peoples of the Orient and Occident have been struggling here against each other. The Latin-Teutonic and the Greco-Slav culture and religion met here also on the battle-ground—the victory going to the latter.

THE MOUNTAINOUS CHARACTER OF THE BALKANS

The very word "Balkans" is nothing less but the Turkish expression for mountain. It indicates the mountainous and ragged character of the region. From the geographical viewpoint the Balkan mountains are merely the southern end of the Carpathians, rising to a maximum height of nearly 8,000 feet, cut off, however, from them by the "Iron Gate," thru which the Danube flows on its way to the Black Sea.

The mountains running down the west coast have repeatedly served as shelter to more than one race. But, in fact, the whole region is mountainous, so that the fertile districts are small, and more or less isolated from one another. They are isolated, so to speak, in natural pockets and corners, small basins alternating with mountain chains, which isolate their settlers from the other. There has been a tendency here to social isolation, promoting the creation of independent social worlds, hostile to other groups and adverse to any outsider.

THE CLIMATE

Within this huge territory there is a wide divergence in temperature. The north and north-east of the Balkan Peninsula has extremely cold winds, carrying with them a considerable amount of snow, as the mountains dividing the region from Rumania are not high enough to protect it from the chilly blasts from the great Russian plain. In the south and southwestern regions, protected partly by the Rhodope Mountains and high table-lands, the climate is much milder and the rain comes usually with a south or southwestern wind. The name of these Rhodope Mountains—the "rose-covered hills"—already indicates a better climate. But many districts suffer from sudden changes in the weather; furthermore, there is a great contrast between the temperature of the day and of the night. These sudden changes, bringing in their wake rain, snow and floods, make the means of communication frequently completely impassable. This causes physical isolation, already promoted by other factors, and a relaxation of energy. It makes for communal organization, for home industries. It aids in the promotion of greater social distance between the peasant and the city people.

INTERMIXTURE OF RACES

The biological factor is characterized by the intermingling of numerous races. By its geographical position the Peninsula became

the rear-guard of Europe against the hordes of Asia; this accounts largely both for the extraordinary mixture of races and languages, of religions and political interest, in the Peninsula, and for the continued interest of the great European powers in the Balkans and in the great land-and-sea junction of Istanbul. The multiplicity of racial types has been accentuated rather than wiped out by refuge offered by the mountains. Wave after wave of invaders have overrun the region, imposing an alien culture upon the resentful victims, and adding new racial groups to the already inextricable mixture existing there. For centuries, the Balkan peoples lived here, retaining, side by side and within the same region, an original particularism. There are a dozen local languages and dialects—five of them being of more than local importance: Bulgarian, Greek, Serbian, Rumanian, and Turkish. There are half a dozen creeds, of which the Greek, Moslem, Bulgarian, and Mosaic complicate the nationalistic allegiances of various groups. These differences were expressed in numberless past struggles, filled with mutual injuries, antagonism and memories of oppression.

THE CHARACTER OF GREAT ROUTES

The mixtures of peoples and the invaders which have overrun the Peninsula are direct resultants of the peculiar topography of the region—as already suggested. In this connection we must notice the importance of the Morava trench and the Vardar valley. The narrow gorge of the Morava, a right-bank tributary of the Danube, running almost due north-and-south for over 100 miles was in olden days a scene of constant political movements southward and northward, because it provided a line of access to the hilly interior of the Peninsula. The political power dominating the Morava valley can relatively easily control the rest of the Peninsula, because from the Morava it is possible to reach the Vardar River, which enters the Aegean to the west of Salonica.

In fact, that the progressive contraction of Turkish territory in the nineteenth century and before 1918 led to such bitter conflicts was largely due to the character of the routes within the Peninsula, and particularly to the difficult access of Bulgaria and Serbia to open water. As a map will show, Belgrade, Salonica and Istanbul are the three nodal points on the northern, southern and eastern margins of the Peninsula, all being important because of the land and water routes converging upon them and the rail linking them. Belgrade utilizes the Danube and the Save for navigation purposes;

it is connected by railroads with the rest of Europe; and the Morava gorge provides a good line of entrance to the interior of the Peninsula. Salonica has the distinction of being the best port for the whole interior of the Peninsula on the Aegean, because two major land routes, consisting of the meridianal furrow indicated by the Morava and Vardar Rivers, converge upon it, as well as the route from Istanbul to the Thracian lowland. The importance of the Morava-Vardar gorge is evident, in addition, from the railway which follows it from Belgrade to Salonica by way of Nish and Skoplje (Uskub). Istanbul, on the bridge between Asia Minor and the Balkan Peninsula, is connected with Belgrade from the Morava valley, by way of the Nishava tributary; the route then crosses passes to the basin of Sofia, whenceforth it continues into the Maritsa Valley, from which Istanbul is reached.

It must be noted that altho these great routes cross one another, they have not developed any notable centers at the points of intersections. This emphasizes that the commercial traffic on them has been of local importance only, altho politically each of the states dominating them has been defending them tenaciously in order to control an exit and entrance for its commerce and levy on the thru traffic. On the other hand, the other states have been trying to achieve a control of these routes in order to become independent of the control exercised by the states dominating them. This explains a number of past invasions and wars and the questions irritating the Balkan states.

HISTORICAL INFLUENCES

Historically the past has left its indelible impression in the Balkans. A part, at least, of each major Balkan peoples have some time or another been under the domination of some other of these peoples, and the legacy of historical hatreds is traditional. Every aspect of the life of the people in the Balkans is profoundly affected by past wars and the fear of future conflicts. The long period of oppression and exploitation under the Turkish rule accounts for much of the backwardness of the region. But the various peoples have never ceased to be agitated by their great pasts. The modern Greek feels that he is the inheritor of the ancient greatness of Hellas; the Young Turks believed themselves to be the heirs of East Rome; the Serbians know that under Stephan Dushan they were the greatest Balkan people when the Turks arrived in Europe; and the Bulgarians advance the history of the Empire of Simeon and Samuel,

an empire which at that time rivalled the Byzantine, and just failed to take Constantinople; the Albanian is proud of the great men he gave to the Turks and reveres the memory of his national hero, Skanderbeg; the Rumanians always look down on their Balkan neighbors, convinced that they are the descendants of the Roman colonists, and remembering the days of Stephan the Great and Michael the Brave. The mutual injuries and the numerous shifts of the borderlines are not forgotten, and the presence of the numerous minorities within the borders of each of the Balkan states is just a fuel for the frequent fanning of such memories.

RELIGIOUS CONDITIONS

So far as religion is concerned, out of the varieties of religious mixtures stands out the dominance of the Greek Orthodox Faith. In every case of the Balkan states, the church has been identified with the rise of the Balkan states—with the present exception of the Turkey of today. The process of the liberation of the local Orthodox Churches from the control of the Byzantine patriarch at Istanbul and the founding of new self-governing national churches was identified with the national struggles of these states, and added further bitterness to the historical memories of the Balkan peoples. Today the church is employed (with the exception of Turkey) to further national interests and to oppose new progressive movements. It does very little in promoting a Balkan co-operation by the very fact that it supports fully the centrifugal tendencies of Balkan nationalism. The presence of numerous religious minorities in the Balkans is a disturbing factor. The emotionalism of particular religious creeds is a fruitful source of bitter conflicts.

THE EXTENT OF ILLITERACY

In the matter of education a high rate of illiteracy prevails thruout the Balkans (with the possible exception of Bulgaria). Illiteracy, as anywhere, has important social consequences. The high birth rate and death rate is just one phenomenon. Agricultural methods are primitive. The social outlook of the peasant is limited and he lacks the sense of social obligations. Under such conditions, the methods of production and consumption are traditional. Political authority rests upon the acquiescence of the masses, and fatalism is conducive to the acceptance of the status quo and to the imposition by other classes on the peasant. Localism and ignorance of large-scale public affairs are characteristic of illiterate populations, and

whatever interest in public affairs exists is mostly village politics. Illiteracy, furthermore, divides society into two segregate groups, and is conducive to the governing by a highly centralized authority, which is controlled by the other classes and by any group which is able to seize it. Dictatorships are possible and accepted. Hand in hand with it goes the predominance of authoritarian religions: Islam in Turkey and Greek Orthodox Christianity have prepared the way for the dictators. In such a society the members must look for their authority upwards by their very habits. Standards of living are distressingly low.

NATURAL RESOURCES

With the exception of Rumania and Yugoslavia, the natural resources are not particularly good and are undeveloped in any case. Altho the foundation of the wealth of the Balkan people is agriculture, the chief difficulty arises from the extreme variability of the rainfall. Occasionally come a few bad years when the rain is insufficient and then the unfortunate Balkan peasant falls into poverty. Many of the peasants, living in this region which is made up mostly of hills and mountain slopes, have turned to flocks and herds. But this has been conducive to lawlessness, and quarrels, characteristic of this kind of people. Additional factors have been constant fighting among the Balkan people themselves and the misrule of the Turks.

THE PEASANT CLASS

The whole region is predominantly agrarian. The majority of peasants own their own land. The industrial proletariat is weak, inconspicuous, and badly organized. There is no revolutionary ideology or tradition behind them. The organization of society is still basically that of individual peasant holdings. A middle class has grown up only in the last two generations, and still is very weak—altho it dominates politically. Altogether the social structure is very primitive. There was a great need for trained people after the liberation of the Balkans. But there is no demand now and the high school and college graduates become mostly political agents for political parties and seek government posts. Thus has grown up the enormous bureaucracy of the Balkan states. It feels that it is beneath its dignity to do menial labor. The members are convinced that it is their right to enjoy a life of leisure, or at least a position of comfort in the governmental employ.

THE NON-PEASANT CLASSES

This class is the most active proponent of Balkan nationalism. If we discard momentarily the elements of religion, language, and history, then the basis of Balkan nationalism is probably poverty: the leaders of each country are desperately tenacious of the frontiers of their country and jealous of their neighbors. As the state in the Balkans develops within its carefully guarded frontiers, the basic passion of the citizen of education becomes national, rather than social.

The member of the non-peasant classes of the Balkan Peninsula thinks differently than the average American. His states are still very young and did not have a very auspicious start. He led the revolutions against the Turkish oppressors and the revolutionary spirit is still within him. He belongs to emotional people whose emotionalism has been accentuated by the social *milieu* and by the systems of production. He lives with very little work, and the complex machinery of modern industrial life has not entwined him in a net and kept him hewing to the line. His schools only recently have introduced sports; his excess energies are burned up in the field he has come to be most interested in—politics, literature and art—but primarily politics. The whole system makes him emotional in politics and an individualist in the game of politics. Dealing with the illiterate masses, he has no belief in the ballot, altho he will praise very highly the theoretical democratic provisions of his constitution. There is shocking political corruption, because the externalities of representative government, alien to native tradition, were superimposed on conditions indigenous to the Balkan countries, which do not include a sense of public trusteeship. Besides, political corruption is the rule rather than the exception everywhere in the world. Furthermore, the middle class of the Balkans knows that the actual use of force has ushered in the governments of the liberated countries in that part of Europe, and an extreme revolutionary measure to get the control of the government is a very acceptable mode of political behavior for it.

THE CHARACTER OF BALKAN POLITICS

Thruout the Balkans great emphasis is set by politicians and others on Parliamentary institutions; and yet the fact remains that no single Balkan country has achieved a successful working of the fundamental basis of such institutions—the party system. Ru-

mania frequently stages an electoral parody which provides for the appointment of a Prime Minister, who may have no following at all in the electorate, but can obtain a substantial majority by "making" the election if he is appointed to the Premiership by the King. In Yugoslavia, the complete breakdown of the Parliamentary system after the troublesome years of trial led to the abolition of Parliament in 1929. The King of Yugoslavia, the late Alexander, had to impose a ban on the fierce political feuds, and his heavy hand provided another parody of Parliament, which really was nothing else but a sanctioning body for the measures decided upon by the King. In Albania the Parliament must respond readily to the wishes of the present King, who might not be a dictator in proclamation, but is a good one in practice. In Bulgaria there has also been shown the inaptitude for parliamentary institutions in the Balkans. It is true that, apart from the period when Stambuliski was in office and when Tsankoff was disposing of the followers of Stambuliski by violent means, the *Sobranye* there may have been regarded as having come nearer to the current relations of governmental majorities and opposition minorities than in any other Balkan parliament. But the corruption of politicians and the tendency of the military officers to dominate politics induced King Boris to inaugurate another dictatorship in the Balkans in the spring of 1935. Greece has been burdened with the gangster methods in politics, accompanied by formal accusations of political opponents. Before his revolution in 1935 Venizelos had to provide himself with a bullet-proof automobile. With this collapse of his revolt, numerous conspirators paid with their lives for their devotion to the cause of Venizelos. In Turkey, Kemal Pasha has learned that it is not wise to allow the excesses of rabid party politics, and has sidestepped such troubles by allowing the existence of only one political party, the members of which are tools in his hands.

All in all, the Balkan parliaments may be regarded as evidence of the breakdown of ordinary party politics, such as understood in Western Europe, and the unsuitability of such ordinary political processes to the conditions in the Balkans.

The army is still an integral part of society, and not a servant of society. The military traditions are strong, because the military means won the victories of independent statehood for each of the Balkan states. An army is still frequently used to bring in a political overthrow.

The centrum of social and political life, in spite of the prepon-

derance of the peasant, is the city. It is not at the village pump that the public opinion is formed, but in the *cafés*. Coffee-houses generally in the Balkans, in default of clubs, have hitherto constituted the chief centers of union and conversation for the middle and lower classes. They often serve as informal headquarters for political parties, and even for campaign meetings.

THE CHANGING MENTALITY

The effects of industrialization, however, which is slowly creeping into the Balkans, is now creating a new social mentality. Before the arrival of the new Turkey, the Balkans were, on the whole, under the domination of Turkey's favorite proverb, equivalent to "Haste is the devil's work." But the motto now becoming popular is "Time is money."

THE FUTURE SOCIAL CONFLICTS

Behind the geographical, ethical, linguistic, religious, cultural, traditional, political and other divisions there stands the peasant, the backbone of the nations of the Balkan Peninsula, the most active and the most conservative element of the state, the least prone to sudden changes and revolutionary madness. There is a wide gap between the masses of the peasants and the trickle of the middle classes. As a matter of fact, the members of the thin middle class of the Balkans live in a world quite removed from that of the peasant. Here is laid the foundation for the present and future struggles. For centuries the slaves of Byzantine mercenaries and Mussulman janissaries, these millions of peasants were politically valueless and helpless, and even today they do not have much to say in the government of the state. But they are now growing into a consciousness of human dignity. The introduction of agricultural machinery is a strong agency in the inception of political awakening, and today the delegates of the common people are fairly represented in the parliaments of these countries. They are often deluded by those who have the advantage of higher education, but they are learning their lessons with rapidity.

Fundamentally speaking, the Balkans have to face a process which is the moving force especially of Russia. Delayed in their economic and social development, these nations are now trying to reach as quickly as possible the standards set by the industrialized nations of the West and America. This process is painful and the political aspects of it produce manifestations which resemble the

well-known political methods of the western countries but take on their own special Balkan characteristics. The Balkans are only now emerging from the traditions of semi-feudalism and even the most enlightened of them have hardly emerged from the traditions of absolute monarchy. But a new affliction—"Western mindedness"—is one of the curious symptoms of the Balkans.

This is evidenced by the fact that no country is willing to admit that geographically it is situated in the Balkans. To suggest to the Rumanian that his Kingdom is in the Balkans is tactless. Yugoslavia considers itself as a central European power. Even Bulgaria, located in the center of the Balkans, likes to draw misleading geographical conclusions from the fact that during the war it was on the side of the Central Powers.

To make the step from the remains of medievalism into modernism is the task of the social leaders of the Balkans. The need for the speed is so great that the Balkan states have been or are since the World War under dictatorships or semi-dictatorships. Order and also a certain community of spirit are being drilled into the Balkan populations.

The Balkan Peninsula presents a fascinating study in social experiments which are in the greatest state of flux and kaleidoscopic changes.

PART SIX

TEACHING CONSERVATION IN THE HIGH SCHOOL

The Urgency and Meaning of Conservation

M. Graham Netting

Misuse of atomic energy and misuse of natural resources are the two major threats to civilization. The first of these is the more frightening to those of us who live in industrial cities, but the second is actually the more dangerous in the long run. One atom bomb can conceivably wipe out a city and render the site uninhabitable for a score of years. Uncontrolled soil erosion has reduced lands of plenty to desolate wastes that have persisted for a thousand years. Continued destruction of natural resources threatens every nation with annihilation yet no country is fully awakened to the need for conservation. Only through education can the peoples of the world be made aware of the immediate need for conservation and the means of achieving it.

Our forefathers set foot in a land endowed with nature's richest bounty — over one-third of the world's coal, vast reserves of iron, zinc, lead, silver, gold, and oil, forests so vast that the warnings of a timber shortage would have been proof of madness, prairies stretching to the horizon, passenger pigeons and squirrels by the billion, sixty million bison and as many beaver, over half of the fresh water in the world, sweet, clean, and teeming with fish. We have squandered these resources faster than any people that ever lived anywhere; we have wasted our inheritance in riotous production. We have failed to heed the early prophets of conservation.

Finally, as the minerals are exhausted, as the forests fail to supply our needs, as worn-out soils yield smaller crops, and as sportsmen clamor for wild-life that is gone, we learn the meaning of conservation — *use without waste*. When the word "shortage" became personal, we began to realize that nature's laws cannot be flaunted indefinitely.

Today true patriotism demands zealous regard for the wise use of all our resources, both renewable and non-renewable. Training for good citizenship needs to include an emphasis on the importance and methods of conservation. Just as good soils produce healthy people, so do good conservationists make good citizens. Only through education can every citizen be taught that conservation is more than a definition, that it is in fact a way of life, a wholesome respect for nature that enables man to live in mutually beneficial harmony with his environment.

HIGH SCHOOL CONSERVATION

THOMAS FRANK BARTON[1]
Indiana University

Within the past decade, in spite of an already bulging high school curriculum, one of the new courses receiving increased attention is conservation. Because in most colleges and universities this subject is offered by the geography department, with geographers rests the opportunity and responsibility of implementing good conservation teachers in our high schools. With this fact in mind, the question arises: How can geography departments best promote high school conservation teaching? Perhaps in the past too much has been written about whether conservation should be included with other subjects or taught as a separate course.

The purpose of this paper is to make some suggestions and list factual experiences the author gained during the past ten years at Southern Illinois University where he instructed and supervised a high school conservation class. It is hoped that this paper will help teachers and administrators who wish to add conservation to the high school curriculum. We all agree that conservation should be taught. Most educators and teachers also will agree the teaching of this subject today leaves room for a lot of improvement. Being still a rather young course, there is a great demand and need for information about introducing and teaching high school conservation successfully.

A HIGH SCHOOL CONSERVATION COURSE

In the fall of 1938, Dr. Hal Hall,[2] principal of the University High School, Southern Illinois University, consented to add a conservation course to the curriculum providing the writer taught it and supervised the college student teachers assigned to the class. The triple objective of such a course was: 1) to furnish content material, 2) to provide an opportunity for the practice teachers to teach the subject, and 3) to give university recognition to a subject which should be added to all high school curriculums in Illinois and especially southern Illinois. By adopting this new course the University High School was the first in the state of Illinois to offer

[1] The experiences presented in this paper are those of the writer during the time he was head of the Geography and Geology Department at Southern Illinois University, 1935-1947.

[2] Dr. Hal Hall is now superintendent of the Belleville Township High School and Junior College.

conservation as a separate subject. From the time it was introduced the writer was placed in charge and held responsible for its growth and development.

Because conservation texts were still not available in 1938, student enrollment was limited. Only seniors were permitted to take the course. Students who had not completed the Physical and Economic Geography courses were advised not to take conservation unless they had a strong background in other physical and social science subjects. Students with a "C" average were also discouraged.

As the course developed and materials were made available, restrictions became more elastic. After suitable texts came off the press sophomores and juniors could enroll. Later the high school physical geography instructor retired and was not replaced. Consequently students were permitted to register for conservation without the important background of physical geography. Economic Geography, tho not a prerequisite is still highly recommended. To encourage students to take Economic Geography as a prerequisite this subject is offered the fall semester and Conservation the spring semester. For both semesters courses are offered at the same hour enabling students to plan a full year's work of geography.

When texts were not available in 1938 student teachers and supervisors prepared and taught units on various phases of the subject. Later *Conservation of America's Resources* by Charles Elliott was selected as a text. We continued to prepare units to supplement the text—chiefly the units built around local and state problems.

In order to be a practice teacher in high school conservation, the university student must meet three requirements. First, he must take the university conservation course and make a grade of "B" or better. Second, in addition to majoring or minoring in geography, he must have a minor or major in social studies or biology. Third, the prospective teacher must show a marked interest in conservation teaching and justify his being given the opportunity to teach the subject. With the exception of the war years, more students asked for conservation practice teaching than we were able to use.

At the peak of the Second World War the university geography staff was reduced to the extent that this high school course could not be offered. It appeared in the curriculum again after the war and it was last offered in 1947. The writer is convinced that con-

servation should be added to the curriculum of every four-year high school in Illinois and the nation as soon as possible. It need not be a required course but it should be made available to those wishing to take it.

GROWTH OF HIGH SCHOOL CONSERVATION IN ILLINOIS

Following the lead set by the University High School, other high schools in the state soon began to add conservation to their curriculum. The first of these were located in the southern part of the state where conservation problems are more acute. The teachers who established these courses were those who had had conservation at Southern Illinois University. Some of the first high schools to offer the subject were Herrin, Dongola, Joppa, Coulterville, and Du Quoin.

Later in 1945-1946 a conservation course was added to the University High School Curriculum, Illinois State Normal University at Normal. Dr. Lathrop in an article entitled "Geography—a 'Must' in Secondary Education," writes, ". . . All who are concerned with the problem in the University High School are convinced that an organized course in Conservation gives students a better understanding and over-view of the problem than can be given from units on conservation which may be taught in other subject-matter courses."[3]

The growth of conservation as a high school subject in Illinois has been helped materially by the support of the State Superintendent of Public Instruction, Vernon L. Nickell. In a letter to the writer dated February 21, 1944, Mr. Nickell wrote: "The time that pertinent problems such as conservation, should be taught, is during the development period of youth. I believe every four-year high school in the State of Illinois should as soon as possible, be able to present a course in conservation, possibly an elective, to any child who elects to take it."

In May, 1947, I received a letter from a teacher of the Rosiclare Community High School, Rosiclare, Illinois, which reads in part as follows: "We are putting a course in our high school on Conservation. What text would you recommend for such a course?"

TEXTS AND BOOKS

At the present time there are several available conservation

[3] H. O. Lathrop. "Geography—A 'Must' in Secondary Education." *Illinois Education*, April, 1947, p. 238.

texts. Four of the best books are: *Conservation of American Resources* by Charles N. Elliott; *Conservation of Nation's Resources* by Harry E. Flynn and Floyd E. Perkins; *Conservation and Citizenship* by George T. Renner and William Hartley; and *The Conservation of Natural Resources* by H. Basil Wales and H. O. Lathrop. Any teacher with the responsibility of selecting a high school conservation text should examine these four before deciding. Regardless of what book is chosen the others should be in the library and in the geography room available for supervised study. Even if *Conservation and Citizenship* is not selected as a text, the teacher should consult it because of its excellent teacher helps.

All high school teachers should use and own if possible the following books. *Conservation of Natural Resources*[4] by George T. Renner gives the best educational approach to the problem of conservation teaching. *Life and Death of the Land*[5] by J. R. Whitaker gives the best world viewpoint and philosophical treatment of conservation yet written. Teachers of conservation should read and reread *The Foundations of Conservation Education* by Henry B. Ward.[6] And the teacher needs a good college text in the subject. Altho it is old and needs revision the best is *Our Natural Resources and Their Conservation* edited by Almon E. Parkins and J. R. Whitaker.[7] As a fifth book for ownership at the present time I would recommend *Elements of Soil Conservation* by Hugh H. Bennett.[8] Then, if your congressman has not used up his supply you may add to your list a free copy of *Soils and Men*, 1938 Yearbook of the Department of Agriculture—otherwise this book can be secured for $1.75 from the Superintendent of Documents, Washington, D.C.

In addition to the four books suggested as possible texts, the following books will prove valuable in the classroom for reference and supervised study:

Baer, Mariam E.: Pandora's box: the story of conservation, New York; Farrar and Rinehart, Inc., 1938.

Bennett, Hugh H.: Elements of soil conservation, New York; McGraw-Hill Book Company, Inc., 1947.

Bennett, Hugh H. and Pryor, William C.: This land we defend, New York; Longmans, Green & Company, 1943.

Butler, Ovid: American conservation in picture and story, Washington, D.C.; The American Forestry Association, 1935.

[4] John Wiley and Sons, Inc., New York, 1942.

[5] George Peabody College for Teachers Press, Nashville, Tennessee, 1946.

[6] National Wildlife Federation, Washington, D.C., 1941.

[7] John Wiley and Sons, New York, 1936.

[8] McGraw-Hill Book Company, 1947.

Camp, Raymond R.: All seasons afield with rod and gun, New York; McGraw-Hill Book Company, 1939.
Chase, Stuart: Rich land: poor land, New York; McGraw-Hill Book Company, 1936.
Cheyney, E. G. and Schantz-Hansen, T.: This is our land, Saint Paul, Minnesota; Webb Book Publishing Co., 1940.
Comstock, Anna Botsford: Handbook of nature study, Ithaca, New York; Comstock Publishing Co. 1914.
Coyle, David C.· Waste: the fight to save America, New York; Bobbs-Merrill Co., 1936.
Dahl, Iriquois: 1001 outdoor questions, New York; Funk and Wagnalls, 1939.
Dahlberg, E. M.: Conservation of renewable resources, Appleton, Wisconsin; C. C. Nelson Publishing Company, 1941.
Glover, Katherine: America begins again, New York; McGraw-Hill Book Co., 1939.
Gustafson, Axel F. and others: Conservation in the United States, Ithaca, New York; Comstock Publishing Co., 1940.
Hawes, H. B.: Fish and game: now or never, New York; D. Appleton-Century Company Inc., 1935.
Henderson, Junuis: The practical value of birds, New York; The Macmillan Co., 1934.
James, Harlean: Romance of the national parks, New York; The Macmillan Company.
Keso, Edward E.: Conserving our resources, Oklahoma City, Oklahoma; School Supply and Publishing Co., 1940.
Lord, Russell: Behold our land, Boston; Houghton Mifflin Co., 1938.
Lorentz, Pare: The river, New York; Harcourt, Brace and Co., 1938.
Melbo, Irving R.: Our country's national parks, New York; The Bobbs-Merrill Co., 1941.
Mitchell, Lucy and others: My country 'tis of thee, Chicago; The Macmillan Co., 1940.
Moon, F. and Brown, N. C.: Elements of forestry, New York; John Wiley and Sons, 1937.
Needham, Paul R.: Trout streams, Ithaca, New York; Comstock Publishing Co., 1940.
Pack, Charles L. and Gill, Tom: Forest facts for schools, New York; The Macmillan Co., 1937.
Parkins, Almon E. and Whitaker, J. R.: Our natural resources and their conservation, New York; John Wiley and Sons, 1936.
Pearson, Thomas G.: Birds of America, New York; Garden City Publishing Co., 1936.
Person, Harlow S. and others: Little waters, Washington, D.C.; U. S. Government Printing Office, 1936.
Pryor, William C. and Pryor, Helen S.: Water, wealth or waste; Harcourt, Brace and Company, 1939.
Renner, George T. and Hartley, William: Conservation and citizenship, New York; D. C. Heath and Co. 1940.
Rossell, Leonard. Tracks and trails, New York; The Macmillan Co., 1928.
Shippen, Katherine B.: The great heritage, New York; The Viking Press, Inc., 1947.
Smith, Joseph Russell. Men and resources: a study of North-America and its place in world geography, New York; Harcourt, Brace and Co., 1937.
Stevens, Ross: Talk about wildlife, Raleigh, North Carolina; Bynum Printing Company, 1944.
Thomas, Lowell: Hungry waters, Chicago; The John C. Winston Co., 1937.
Tippett, James S.: Paths to conservation, New York; D. C. Heath and Co., 1937.
Van Dersal, William R. and Graham, Edward H.: The land renewed, New York; Oxford University Press, 1946.

If the high school has a large library, some of the following books might be placed there for less frequent use:

Allen, S. W.: An introduction to American forestry, New York; McGraw-Hill Book Company.
Baer, Mariam E.: The wonders of water, New York; Farrar and Rinehart, Inc. 1938.
Baynes, Ernest H.: The sprite, New York; The Macmillan Co., 1939.
Bridges, Thomas Charles: Wardens of the wild, London, England; George G. Hanap and Co. Ltd., 1937.
Brisner, Ayers and Shappard, Ward: Our use of the land, New York; Harper and Brothers, 1939.
Burges, Austin E.: Soil erosion control, Atlanta, Georgia; Turner E. Smith and Co., 1936.
Connery, Robert H.: Governmental problems in wild life conservation, New York; Columbia University Press, 1935.
Gabrielson, Ira Noel: Wildlife conservation, New York; The Macmillan Co., 1941.
Gabrielson, Ira Noel: Wildlife refuges, New York; The Macmillan Co., 1943.
Goslin, Phyllis A. and Goslin, Omar P.: Rich man, poor man, New York; Harper and Brothers, 1935.
Graham, E. H.: Natural principles of land use, New York; Oxford University Press, 1944.
Gustafson, Axel F.: Conservation of the soil, New York; McGraw-Hill Book Co., 1937.
Holbrook, Stewart: Burning an empire, New York; The Macmillan Co., 1943.
Jacks, G. V. and Whyte, R. O.: Vanishing land: a world survey of soil erosion, New York; Doubleday, Doran and Co., 1939.
Johnson, G. W.: The wasted land, Chapel Hill; University of North Carolina Press, 1937.
LaGorce, John Oliver: The book of fishes, Washington, D. C.; National Geographic Society, 1939.
Leopold, Aldo: Game management, New York; Charles Scribner's Sons, 1933.
Sears, Paul B.: Deserts on the march, Norman, Oklahoma; University of Oklahoma Press, 1935.
Turner, E. L.: Every garden a bird sanctuary, London, England; H. F. and G. Witherby, Ltd., 1935.

SOME RECENT ARTICLES

During the last ten years, the number of articles on philosophy, methods, and aids for conservation education have increased. The teacher of a high school conservation course or of conservation units in other courses may read with profit the following articles:

Barlte, Glen G.; Ekblaw, Sidney E.; Hilken, Henry G.: Conservation of our fuel resources, Journal of Geography, v. 39, 1940, pp. 274-280.
Barton, Thomas F.: Teaching conservation in the high school, Illinois teacher, v 28, 1939, pp. 71, 94-95.
Beard, W. P.: Social viewpoint in conservation education, Social education, v. 3, 1939, pp. 637-640.
Carter, Harriet: Our national forests—a social problem, Journal of geography, v. 39, 1940, pp. 151-155.
, Saving our soils, Journal of geography, v. 37, 1938, pp. 308-318.
Davis, David O.: Soil and water conservation, Journal of geography, v. 40, 1941, pp. 307-310.
Duthie, George A.: Forestry and the public schools, Journal of geography, v. 36, 1937, pp. 186-192.

Freeman Otis W.: Conservation as a post-war problem, Education, v. 65, 1945, pp. 316-322.

Halverson, L. H.: Whither conservation education, Journal of geography, v. 46, 1947, pp. 178-181.

Hartley, W. H.: Illustrative materials for conservation education I, pictures, charts, and posters, Journal of geography, v. 41, 1942, pp. 288-295.

Illustrative Material for conservation education II, slides, v. 41, 1942, pp. 332-335.

Illustrative material for conservation education III, film strips, Journal of geography, v. 42, 1943, pp. 33-36.

Illustrative material for conservation IV, objects, specimens, models, Journal of geography, v. 42, 1943, pp. 59-60.

Illustrative material for conservation education V, maps, Journal of Geography, v. 42, 1943, pp. 108-111.

Illustrative material for conservation education VI, motion pictures, Journal of geography, v. 42, 1943, pp. 153-157.

Innis, Harold A.: The economics of conservation, Geographical review, v. 28, 1938, pp. 137-139.

Lathrop, H. O.: An experiment in conservation education, Journal of geography, v. 46, 1947, pp. 96-100.

Michand, Howard H.: The Indiana conservation camp for teachers, School science and mathematics, v. 47, 1947, pp. 141-145.

Miller, George J.: Planning and conservation, Journal of geography, v. 35, 1936, pp. 157-160.

Odum, Evelyn and Hammer, Irwin A.: The land is a teacher, Educational leadership, v. 4, 1947, pp. 310-314.

Parson, Rueben L.: The responsibility of geographers in land planning, Education, v. 60, 1939, pp. 229-231.

Reitz, William W.: Teaching resource conservation thru geography, Journal of geography, v. 46, 1947, pp. 227-234.

Renner, George T.: Conservation as unit of study in geography, Education, v. 58, 1938, pp. 283-290.

Teaching conservation of resources, Journal of geography, v. 38, 1939, pp. 245-251.

Strong, Helen M.: The soil conservation service and its work, Journal of geography, v. 36, 1937, pp. 249-260.

Planning and conservation, Journal of geography, v. 36, 1937, pp. 118-120.

Symonds, Clare: Tackling the erosion problem in high school geography classes, Journal of geography, v. 40, 1941, pp. 30-33.

Webb, Lina: A field study of agriculture in north Alabama, Journal of geography, v. 39, 1930, pp. 301-308.

Whitaker, J. R.: The place of geography in the social studies from the view point of conservation education, Journal of geography, v. 42, 1943, pp. 12-21.

International aspects of conservation, Journal of geography, v. 43, 1944, pp. 121-131.

Place relations in conservation education, Peabody journal of education, v. 18, no. 4, 1941, pp. 207-213.

OBJECTIVES AND GUIDING PRINCIPLES

The objectives and guiding principles of conservation teaching have been so well given by others that the writer need not take time

to list them here. Consult Whitaker, in his article entitled "The Place of Geography in the Social Studies: From the Viewpoint of Conservation Education."[9] He gives both objectives and guiding principles. Also in his book *Life and Death of the Land,* Whitaker devotes Part III to the teaching phase of conservation.

In Renner's book *The Conservation of National Resources,* chapter 8 is entitled "Objectives in Conservation Education." Moreover in the book *Conservation and Citizenship* of which Renner is co-author, the objectives are printed on the back of the picture which introduces each chapter or phase of the subject.

PERSONNEL

Because conservation content material comes from so many subject matter fields, and its problems are so complex, the high school conservation teacher must be well trained. Few if any instructors who have not had a college or university conservation course should be permitted to teach the subject. So important is the course that some states require all teachers to take conservation before they can certificate to teach any pre-college subject at any level.

An average of "B" in a college conservation course is not necessarily the key to success. It is important that the prospective teacher take practice teaching in the subject. The administration of every institution endowed with the responsibility of preparing future teachers for the region it serves should seriously consider if it is providing an adequate teacher training program in conservation.

The prospective teacher should be a geography, social studies, or biology major with possibly minors in one or both of the other two subjects. The geography major should have about equal training in the physical and social studies phases of the subject.

The conservation teacher should enjoy the out-of-doors, like to conduct field trips, and have a personal interest in organizations which deal with land utilization. He should participate in some regional, state, or national organization that is promoting conservation in the community and region in which he lives. For example, he may belong to a county soil conservation organization or to a local chapter of Friends of the Land.

[9] Whitaker, J. R., The Place of Geography in the Social Studies: From the viewpoint of Conservation Education, *Journal of Geography,* Volume 42, 1943, pp. 12-21.

If a short conservation workshop is held in his county, the conservation teacher should take advantage of the opportunity and become better acquainted with the conservation problems and personnel of his local area.

Moreover, if a sufficient part of the teacher's time is devoted to conservation teaching, he may enroll at one of the summer conservation camps sponsored by the universities in various states such as Indiana or Ohio.

CONSERVATION AND THE CURRICULUM

The conservation course can be of greatest service in the high school curriculum if the advanced students study the subject as a capstone to their social studies, biology, physical science or vocations courses. Both terminal and college preparatory students should be permitted to take the subject. The credits earned should be recognized in any of the areas or fields named above. Students who have taken a large number of agricultural courses should not enroll for conservation unless the agriculture and conservation teachers agree that they will profit from such a course.

That a high school has a good two- three- or four-year agriculture course should not be used as an excuse by Principals for not adding conservation to the curriculum. In only a few high schools do most of the students enroll in agriculture. In the others, students majoring in other subjects do not have the time or desire to take several courses in agriculture in order to get the complete picture and basic understanding of conservation. In fact, few high school agricultural departments cover all the phases of conservation. Many agricultural departments do not present such phases of conservation as minerals, parks, highway beautification, floods, planning, etc. Furthermore, as a rule, urban students do not enroll in agricultural courses.

The writer does not recommend a conservation course for the junior high school. These pupils may have a keen interest in the use of natural resources and are old enough to know that resources can be exhausted if not protected or replenished. The logical place to introduce and develop principles of preservation, utilization, and restoration is in the senior high school. These mature students can better comprehend the biologic, economic, geographic, historic, political, and social phases of our present conservation problems. Conservation makes a good capstone course in a social studies, physical science, or biology major.

STRESS COMMUNITY AND REGIONAL PROBLEMS

Regardless of what text is selected and what supplementary books are chosen, the responsibility of teaching the local and regional problems falls upon the teacher. Texts written for national use cannot develop special problems peculiar to the community or region. Pupils are usually interested in local and regional problems. The person who covers a textbook unit on forests and fails to call attention to a nearby national forest or the need of woodlots in the community or county is a poor teacher.

Practically every community, no matter how small, has conservation problems and projects. Often these conservation projects are within a short distance of the high school. For example, when teaching a unit on forests at the University High School at Carbondale we studied the Shawnee National Forest which is being established in the local and adjacent counties. We also discussed farm woodlands because substantial areas of many Jackson county farms are best suited to trees. Moreover, five to six million acres of land in Illinois should be growing trees and over half of this land is in the southern one-third of the state where the University High School is located. Then during the study of water resource, the problem of city water supply, the flooding of the county's rich bottomlands by the Mississippi River and the Use of Crab Orchard Lake are all taken up. Each teacher will need to cut the cloth of his course to the pattern of local and regional conservation problems. Generally textbooks give the national picture and stress the basic concepts, ideas, and attitudes.

Some teachers need help to develop and prepare their own units on local conservation problems. To help them in this work Renner on page 192 of his book, *The Conservation of National Resources,* gives a helpful outline as a guide in studying the local environment.

APPROACHES

There are some teachers who believe high school pupils will not be interested in conservation. Their reason is that city pupils will think conservation is agriculture and that they never expect to live on a farm or own a farm. These fears will usually prove groundless if the teacher uses four approaches to the subject, namely, citizenship, health, city dependence, and vocation.

Citizenship. For most pupils in large high schools, conservation education is purely impersonal. Few of these will have a direct

part in the management and utilization of forests, fields, and minerals. Yet in a democracy, all adult people are given the opportunity to vote. They should be given understandings and attitudes which will make it possible for them to approve or disapprove what private enterprise or public agencies are doing with natural resources. These young people will help elect representatives to state and federal governments who will vote for or against laws, methods, and policies of restoring and conserving our resources.

What better method is there to teach citizenship than by studying current conservation problems and the methods required to solve them? During the study of these problems governmental agencies, bureaus, and departments became functional parts of our government rather than encyclopedic knowledge.

Health. Because of rapidly developing bodies, athletic events, and physical training, high school pupils are and should be interested in matters of health. A large amount of literature is appearing to substantiate the relationship between good health, good food, and good soil. Stressing the point that the health of city people is dependent in part upon the protection of our soil from erosion and fertility depletion, arouses an interest in good health and resources.

City dependence. The wise use of natural resources influences the lives of both urban and rural people. Cities need a constant flow of resource products to furnish food and raw materials for their factories. Once city pupils understand the degree to which cities depend upon resources, their interests in conservation begins. If they have not had an Economic Geography course before studying conservation they may need to be introduced to the philosophy of interdependence between city and country.

Vocational. Perhaps less than a fourth of our high school pupils plan to farm or own farm land. However in rural and small city high schools the fraction will be much higher. High school students who live on the land or whose parents own land take a greater personal interest in conservation problems. They not only want to obtain correct conservation understandings and attitudes but they are interested in detailed corrective methods and techniques. Some pupils have an opportunity to apply almost immediately conservation measures learned in this course.

CONCLUSION

Conservation, as a course, should not be added to the curriculum

unless a well trained teacher, books, and necessary equipment are available. Much of the value of the course will be lost unless community and regional problems are studied and the local community used as an out-door laboratory. Because of their local and regional settings and problems, many high schools should be offering a conservation course. How long will high school administrators remain blind to the problems of the area in which their high schools are located? Ten years ago the administrators could use the excuse that tools, books, visual aids, and teachers were not available. Today equipment and more teachers are available. The responsibility in many places now rests with the school administrators.

INTERNATIONAL ASPECTS OF CONSERVATION

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Most of the work in conservation of natural resources has been local, regional, or national in scope. Effective action has not gone, in general, beyond national or empire limits. There are certainly outstanding examples of need for co-operation, however; and there are notable examples, too, of genuine achievements in the field of international conservation, sufficient to justify the hope of more wide-ranging effective action in the near future.

A PROBLEM FOUND EVERYWHERE

Basic to international action is the fact that resource destruction is not limited to a few places but is widely distributed over the entire earth. Indeed, the destruction of natural resources is as old as man and as wide as the inhabited earth. Men cannot live on any part of the earth without tending to damage critical elements in the natural-resource complex. Seeds of destruction are resident in every mode of occupance.

Running thru the conservation literature of the early 1900's is the notion that only the people of the West—folk with the material culture of western Europe—have been guilty of resource destruction. True, they have been exceptionally destructive in a short time, but others have wrought similar damage over a longer period. The hills of interior China have been denuded of forests and soil; the tropical rain forests have been largely cut over.

Indeed, the regions of the world may be put in one of two classes, according to whether the destruction has been slow but continuous over a long period of time, or recent and more violent. The hill lands of China and Italy fall in the first class, the grass lands of the Union of South Africa and the United States in the second.

Whether it be the Eskimo with depleted hunting ground, the nomadic Arab searching with his flocks for pasture in areas overgrazed for ages, or stranded mining communities in the Appalachians; from pole to pole and around the world, men are facing the problems that arise as a consequence of destruction and impairment of the natural-resource base.

With similar problems found in so many places, it would seem that there might well be a sharing of experience, a pooling of the understanding gained from conservational efforts. That such a common body of conservation principles is accumulating is reflected in such publications as *Soil Conservation.* With the discovery in prehistoric times of plant and animal domestication, the soil of the occupied earth came under attack. The plow and other mechanical devices intensified the rate of soil wastage. Recent experiences with the extension of plow culture in tropical Africa verify conclusions regarding the dangers involved; and it is hoped that the lessons learned in regions where the plow has long been in use will find speedy application in these areas of most recent extension of plow culture.

SHARING THE RESOURCES OF A CLOSED SYSTEM

As long as men could meet their needs in their home areas, little thought was given to the fact that all men live within an almost closed system of resources, that of the earth (completely closed off by itself except for the reception of insolation). Now that the sustenance area of commercial peoples is the whole earth and the resources of the earth have undergone noteworthy shrinkage, the fact that world resources are definitely limited becomes of increasing concern.

As mankind approaches the resource limits of the entire world, the experiences of the human race resemble those of islanders who early reached the limits of the resources of their restricted homeland. In some of the South Sea Islands, the bases of life were early subject to severe pressure as populations increased. The limits imposed by the island environments were soon felt—it is no wonder that such practices as infanticide were invoked among

primitive peoples to bring the population needs into balance with resources. In a sense, the whole earth is an island, and we have now explored it to its outer limits, and find that its resources, too, are exhaustible. These world limits are particularly impressive for the mineral resources. As recently stated in a report of the National Resources Board, "The whole world is stranded with a limited supply of mineral fuels." Limits on such materials as phosphate rock may actually prove even more critical in the end.

It is now hard to realize that only 450 years ago a vast, fresh double continent lay open to emigrants from Europe. Today we are entering a new era of land occupation: there are no new, empty, or emptying lands; no lands occupied by weak people and unclaimed or unprotected by great powers. We have reached the end of our wandering by coming back to the starting place. This is the only world we have to inhabit, and we have occupied virtually all of it. We have reached the end of our journey. As a consequence, in the words of Mackinder, "We are now for the first time presented with a closed system. The known does not fade any longer through the half known into the unknown; there is no longer elasticity of political expansion in lands beyond the Pale."

Perhaps no single resource more effectively illustrates the dilemma toward which the world is heading than does the whale. Originally hunted on the Bay of Biscay by Basque fishermen, there is now practically no part of the ocean where whales are safe. Moreover, the resources of the northern hemisphere are largely exhausted, and fishing is concentrated mainly in southern waters. There the whales are exposed to exploitation by all maritime nations, notably Norway and Japan. As a part of an effort to conserve these animals, it has been recommended that there be a global quota of whales; that each capture be reported by radio; and that the season be terminated when the world's quota has been reached. Here we have a worldwide attack on a resource, and the necessity for world co-operation if it is to be conserved. Men have definitely pushed to the limits of our planet so far as this resource is concerned. Petroleum bids fair soon to illustrate this same crowding of the limits of the world's resources; and in time the list of earth's materials for which men ransack the world will be a long one.

COMPLEXITIES RESULTING FROM GEOGRAPHIC DIVERSITIES

Anyone who gives much attention to the international problems

of conservation must surely be impressed by the tremendous need for co-operation, and also by the fact that co-operation is made difficult by differences between regions and nations in the kind and magnitude of conservation problems faced.

One of the more fundamental contrasts is between the old, more or less exhausted lands and the new, relatively rich ones. Two French geographers, Brunhes and Vallaux, pointed out many years ago that destructive occupation marked, in general, the first stage in the settlement of an area. The fur trade of colonial America and the exploitation of soil brought about by tobacco farming in colonial Virginia illustrate this truth. Indeed, it is a safe generalization that prodigal use of natural resources and pioneering life go together. The people of older lands have learned the limits of their resources and are much more willing to apply conservation measures. As a consequence, the older and the younger nations find it difficult to discover a common ground on which to attack their mutual problems. We see the same conflict within a country such as ours, with an older and a younger section. In the West, there is impatience with the desire of the East to withhold the minerals of the public domain from rapid development: the East calls this conservation, the West views it as a needless locking up of resources.

This difference between old and new lands influences the relation of colonial lands and the commercial centers to which they are related. In a colonial area, there is a tendency to exploit the natural resources with little regard for their safeguarding, to trade them for the commodities desired from the mother country. No matter how much England might desire the conservation of the soil resources of the British Empire, it would doubtless meet considerable opposition if it attempted to impose restraints on the dominions or even the colonies.

Too commonly the home country has actually encouraged resource destruction in the colonial area. Men have even boasted that fertility of the fields of the colony was being exported (as grain) to the mother country, there to support livestock, and thru them to maintain the fertility of the fields. As this process goes on, however, there eventually comes a leveling out of resources, and then the true situation is revealed; the welfare of the region or country tends in the end to merge with the welfare of the entire world.

SIGNIFICANCE OF TRADE

The international aspects of conservation are intimately tied up with the movement of goods. The rewards of trade have been a vigorous incentive to resource destruction. Altho we cannot agree with Jacks and Wythe, who blame *foreign* trade exclusively for promoting resource destruction, for this same stimulus operates within the political unit, the fact remains that the destruction in a colonial area is commonly stimulated by the fact that there is an overseas market where the minerals or wood or ivory can be traded for the commodities provided by the older, more advanced products.

In this day, when the sustenance area of the commercial nation is the entire earth, trade is the means by which the market draws on the distant resource. More and more, attention is being centered on the best and largest mineral resources, the richest soils, the best reserves of wildlife; and the world-wide transportation net which we now have makes it possible for the world demand, as for tin, to center on a relatively few spots. The demand of the entire world is thus brought to an intense focus. It is obvious, moreover, that the area being exploited is not ordinarily under the control of the market; the world has a stake in the conservational production of petroleum in Venezuela, but the immediate political control lies within that country rather than with the buyers.

Here is another way in which trade has worked to the detriment of resource conservation. For the world as a whole, production from managed or conserved resources has had to compete with production from wild resources. The difficulty in making forestry pay is due, in large part, to the fact that timber from managed forests has had to compete with wild timber, which costs nothing or next to nothing to grow. So uninventive and unmanageable, have men been that they must needs dissipate the riches of nature before efforts to counteract that depletion become economically feasible.

As trade has been the principal relation involved in the impact of one nation on another's resources, so interferences with trade have marked and will mark efforts to counteract resource shrinkage. As critical materials become scarcer, nations will be tempted to limit exports. Peru has already done this for guano. Canada forbids the export of unmanufactured pulpwood taken from crown lands. We have talked about applying a similar export tariff to

phosphorous rock; indeed, we have even given serious attention to regulations which would aim to prevent all export of this critical raw material.

It is easy for men to fall into two directly opposing camps on the issue of control or restriction of the export of materials deemed critically important to national well-being. On the one hand, it may be argued that these materials should be kept at home because they are badly needed. On the other hand, it may be urged with equal fervor that no nation has a right to keep exclusively to itself the natural resources with which it is endowed. From a very practical point of view, it would appear to be of doubtful wisdom to refuse to share with other nations, for no single nation on earth is in a position to live entirely without the aid of raw materials and goods from others. Mutual aid rather than selfish attention to one's own needs alone would seem to be the proper course to pursue.

A special aspect of the relation of international trade to resource destruction is that presented by the growth of cities. There is much justification for the view held by the Russian geographer, Woeikof, that the destructive tendencies of the Nineteenth Century were largely traceable to the rise of cities. He held that the city dweller is so far removed from nature that he is unmindful of the damage he is doing. As I see it, the detrimental effect of cities on resources rests not on the blindness induced in urban dwellers but on the fact that they provide such a splendid market for the raw materials of rural areas. While it is true that the city dweller is commonly quite unconscious of the waste that is going on in the areas on which he draws, nevertheless it is the reward of trade that prompts that exploitation. The great cities of the world have grown up pretty largely since the 1870's and 1880's. Together with the development of rapid cheap transportation, they have contributed their share toward aggravating the international problem.

The Impact of Nationalism

The world-wide depletion of natural resources which has accompanied the growth of world commerce has been unquestionably in part a result of that growth. Whether the trend toward nationalism, which in some ways runs counter to international trade, will result in a corresponding improvement in the general situation remains to be seen.

Economic nationalism has certainly done at least this, it has

directed attention to the natural resources of the nations, their character and extent. It has stimulated the taking of inventories, one of the necessary steps in all wise conservational activity. In some countries, particularly this one, governmental action has gone so far as to encourage the spending of human resources to conserve the natural—such as the employment of CCC workers in forest conservation during the depression years.

An essential part of the requirements of economic nationalism is national planning. If planning is carried far enough, it can but give direct attention to the problem of resource depletion. Here is another way in which nationalism promises much in terms of resource conservation.

Underlying the whole relation between nationalism and conservation is the fundamental fact that the state is assumed to have immortal life. To exist an indefinitely long time, it must have a material basis. Accordingly, the safeguarding of the natural-resource base becomes one of the principal obligations of the state.

This urge toward national self-sufficiency may have the effect of promoting conservation at home but of intensifying the destructive impact of that nation on foreign areas. The Japanese have been remarkably successful in safeguarding their soil, forests, and water power, but to date they have flatly refused to co-operate in whale conservation. They have also destroyed the wildlife resources of certain islands which they did not intend permanently to occupy, while at the same time they have safeguarded these same resources on their own home areas.

The close tie-up between economic nationalism and conservation has convinced some students of the problem that conservation is limited solely to national self-interest and that it cannot escape these limiting bonds. It is easily possible, of course, to look at the whole matter in that way. On the other hand, it is just as logical to note that the nation is the largest practical unit for achieving or negotiating a world-wide conservational program. In this regard as in others, it appears that the highest interest of the individual nation will be served by providing arrangements for international solutions to problems that go beyond the range of the home country. Indeed, there are some grounds for thinking that we could scarcely move on to an international plane without first passing thru the nationalistic stage.

RESOURCE GROUPS OF PARTICULAR SIGNIFICANCE IN INTERNATIONAL CONSERVATION

Sharply Localized Fund Resources. Reference was made previously to the fact that the people of the earth are "stranded" with a limited amount of mineral resources. The development of technology has made each major country dependent upon the mineral resources of other lands, and the rise of world commerce has enabled that world-wide demand to focus on relatively small areas. It thus becomes of major importance that these limited resources be used wisely in the interest of the people of the entire world. There is, therefore, need for international co-operation toward that end. This seems a very large order and an ideal that may possibly be quite a long way off. On the other hand, the depletion of certain resources, such as petroleum and tin, is going forward at such a rapid rate that some kind of co-operation is most assuredly needed.

At a time when the world is at war, it may seem to be rather absurd to suggest that world-wide co-operation in mineral conservation is a possibility. This doubt merely points to the fundamental truth that underwrites all conservation theories—the one way in which the nations of the world can co-operate most effectively to safeguard natural, as well as human, resources is to settle their quarrels in some other way than thru the instrument of war. War has been and continues to be the most destructive process known to man. The elimination of war would dwarf all other achievements in international conservation.

Sharply Localized Renewable Resources. Like mineral resources, there are certain renewable resources which are subject to world-wide demand but are found in only a few places on the earth. Perhaps there is no better example than the sandalwood of the Hawaiian Islands. Exploitation of sandalwood was slow to start but grew rapidly after 1810, when native chiefs began to grasp its economic significance. So rapid was the destruction of the sandalwood of the Islands that by 1825 the supply was practically exhausted. Certainly it is to the interest of the world as a whole that these sharply localized resources be not completely destroyed, altho the actual application of conservation principles must of necessity be carried out by the nation holding the resource. Quite different are the resources which are shared or held in common.

Shared Resources. There is no field in which international co-

operation is more needed and can be more effective than in the safeguarding of the shared resources, those resources which belong in part to one nation, in part to another. It appears that these resources are primarily, if not exclusively, of the circulatory kind. Resources which move from one country to another consist mainly of waters and wildlife.

It is a commonplace in water conservation that, if a stream is to be used most effectively, the entire drainage basin must be taken as a unit. A river basin is a natural, a hydrographic, unit, and to the extent to which it is used it must be regarded as a human-use unit too. Any change, for example, that is made in the quality and quantity of the water in any part of the system is passed downstream and affects people at a lower level. Accordingly, wherever a drainage basin is shared by two or more nations, an international problem of considerable importance results. Here is one of the more promising places for international action toward resource conservation. The United States has several international problems of this sort. The Colorado River and the Rio Grande present problems of co-operation with Mexico in connection with the development of irrigation, and the utilization of the water power of the lower St. Lawrence requires co-operation between the United States and Canada. Europe has a great many such opportunities for international action, notably in connection with the wise use of the Rhine and the Danube.

Migratory wildlife constitutes another shared resource, one that can scarcely be safeguarded without full co-operation of all the countries concerned. Fortunately we have a fairly satisfactory arrangement between the United States and Canada in the protection of migratory birds. One cannot say so much for our relations to our neighbors to the south. Of these southern countries, at least six have no protective laws at all. Only Argentina, Brazil, and Uruguay have local laws approaching adequacy; and there is evidence that much of the national domain in each of these countries is covered only casually and that enforcement is rare. The West Indies are also a source of strain on the supply of birds that migrate between the United States and the mainland of South America. One of the worst offenders is the densely peopled Barbados, where snipe, for example, are slaughtered, with full support of the law, not only on the island's natural swamps but on some twenty-odd specially constructed ones. We are reminded in this connection

of the point made by Raymond Cushman Murphy that conservation must be continental in scope in order to be most effective. The co-operation of two or more countries in safeguarding the water resources of a drainage basin is pretty largely dependent upon official action; international co-operation in the conservation of wildlife depends not only on official action but also on the wholehearted co-operation of the individual citizens of the various countries. To put an end to the slaughter of song birds in southern Europe, as well as northern, or in North America, as well as South America (at both ends of the range of migration), would appear to be an extremely difficult problem but not an insurmountable one.

Resources Held in Common. Ranking with shared resources as a promising place at which to enlarge international conservation within the near future are the resources held in common. These resources consist primarily of the wildlife of internationally owned or controlled waters, mainly the great ocean areas, but also including such international waters as the Great Lakes.

Time after time, the Great Lakes states have endeavored to regulate fishing in such a way as to maintain the supply undiminished. The history of each attempt has been the same. There has been no great difficulty in getting representatives from the various states and Canadian provinces to agree on minimum essentials. The real difficulties lay in getting the various state legislatures to enact these regulations into law and in securing enforcement of them once they were enacted. To date it has not been possible for all of the states and provinces to secure anything like a common front in attacking the depletion of fish in the Great Lakes area.

Another problem which urgently calls for international co-operation is the depletion of the haddock on George's Bank, east of the coast of Massachusetts. It is definitely demonstrated that haddock that are too small are being caught and sold. The recommended regulations are relatively simple. They include a minimum mesh size for use in the trawls and a minimum market size for the fish that can be landed. These regulations would, of course, have to apply to all of the vessels visiting this area if they were to be most effective. Most closely involved in this problem are the United States and Canada.

One might cite numerous illustrations of the need for co-operative action and of failure to achieve it. On the other hand, there are notable examples of high accomplishment. We have commonly pointed to the treaty arrangements between the United States and

Canada in conserving the halibut of the Pacific coast and to the arrangements between the United States, Japan, Canada, and Russia for the conservation of the seals of the Pribilof Islands. Even here, however, there is real reason for concern. The agreement to conserve the halibut fisheries is between the United States and Canada; a ship outfitted in Great Britain to visit these waters was finally stalled off by joint action of these two countries. There is no guarantee, however, that some other nation may not break into the area, violating the treaty regulations. Moreover, in 1941, Japan abrogated the Fur-Seal Convention which had regulated the taking of seals in the Pribilof area since 1911. Discussions between the United States and Japan were under way when the Pearl Harbor incident occurred.

Utilizing the "pastures of the sea" is one of the principal ways in which men can supplement the food derived from the land. In terms of direct use the ocean has little other value except for transportation. It is, indeed, a sad comment on man's ability to cooperate to solve obvious problems of major international import, when he fails to meet the problems which our ocean fisheries present.

WAR VERSUS MUTUAL AID

All suggestions for international efforts toward resource conservation fade into comparative insignificance beside the one calling for the elimination of war as a means of settling disputes. The Second World War sped up the rate of depletion of mineral resources to a point that is almost inconceivable; it has brought about the destruction of soil and forest resources in each of the major countries involved; in bringing non-agricultural land into crop use, it has laid the foundation for a more serious soil erosion problem in the post war years; it has cancelled out practically every cooperative agreement between the various nations now ranged on opposite sides. As a cause of destruction of natural resources, Twentieth Century war stands unrivaled; no conservation measure could possibly outrank the displacement of war by peaceful means of settling international disputes.

SAVING OUR SOILS

A Unit of Study for Junior and Senior High Schools

HARRIET CARTER
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If our young people do not learn national economic facts in high schools, what basis will our lawmakers of the future have for a national welfare point of view? The wasting of our fertile soils is a national welfare problem.

"When the soil is gone, men go."

The soil loss in the United States had become serious in many parts of the country, but it had gone on so insidiously that many did not realize that much of their topsoil was gone until the dust storms aroused the nation to the fact that soil is not a permanent resource unless soil conserving land use practices are applied to the land. Removing the forest and grass cover in the East or Far West, and the grass cover on the Plains, then cultivating the fields up and down the hill, planting clean cultivated crops, or leaving the ground bare for a season had brought about this serious soil loss.

These lessons are planned to develop the basic ideas that the soils are a national trust and that their best use can be determined only by the farmers themselves with a national point of view, utilizing the best scientific soil conservation practices available.

Unless the six million farmers who control the use of most of the arable land in the United States will co-operate in adopting soil conserving land use practices, our United States in a few generations will contain even larger areas of waste land.

"Where there is no vision, the people perish."

The material presented in this outline can be adapted easily for Junior or Senior High School pupils.

I. The purpose of this study
   1. To create an intelligent interest in saving the soil of the United States.
   2. To emphasize the interdependence of rural and urban communities.
   3. To demonstrate the value of the cooperation with the Federal Government in local problems which are integral parts of the national problem.
   4. To show the importance of work being done by the farmers along the lines of soil conservation, and the way in which farmers may establish Soil Conservation Districts for furthering sound land-use practices on their own farms.
   5. To develop a national welfare point of view.

Courtesy, U. S. Soil Conservation Servic

A well developed gully which is an all too familiar feature of many farms. Note how headward erosion is eating its way to the top of the ridge.

II. Challenging facts

1. The United States has about 522,000,000 acres of crop land. Of this, 50,000,000 acres are ruined for agriculture, and 50,000,000 acres more are nearly ruined. In addition, 100,000,000 acres have lost the greater part of the topsoil.
2. More than three-fourths of the United States is sloping land with an average depth of topsoil of about seven inches to eight inches. This topsoil is being removed so fast that in many areas it would all be gone in three years to twenty years, in others it would be gone in sixty years to seventy-five years.
3. Each year more than 500,000,000 tons of soil enter the oceans.
4. Wind and water each year remove beyond use three billion tons of soil—an annual money loss to the nation of not less than $400,000,000.
5. Erosion removes each year twenty-one times the amount of plant food used by crops.
6. Thirteen major reservoirs in the Carolinas and Georgia have been silted to the top of the dams within an average period of thirty years.
7. The Soil Conservation Service was established by an Act of Congress, April 27, 1935, to conserve the soil and water by land treatment.
8. During the year 1936-37 soil conservation demonstration operations covered 8½ million acres of private land, and involved cooperation with more than 50,000 individual land owners.
9. State Soil Conservation Districts Laws have been passed by 22 states.
10. Thru the soil conservation district, land users of any community may join with the Soil Conservation Service and other governmental agencies in the formulation and execution of conservation plans.
11. Thru soil conservation districts, opportunity for cooperation between the land user and the Government is broadened for the first time to include the whole of our farm and grazing lands. Such cooperation no longer is limited to isolated demonstration areas.

III. Soil erosion in the school locality

Note: After observation in the locality, the following points, and others, may be brought out in reports and discussion.

1. Water erosion
   - Gullies
     - Beginning or well-developed
     - Steep or sloping sides
     - Worn thru topsoil, subsoil, into rocks
   - Silt
     - Sorted in size of particles
     - Spread over lower land
     - Washed over sidewalks, roads, gardens
   - Muddy streams
     - Where does the mud come from?
     - Where does mud go?
     - What damage is caused by the mud?
       - Note: A two-quart glass can filled with muddy water from a stream in New Mexico was more than half full of mud when it had settled.
2. Wind erosion
   - Dust storms
     - When and from what direction?
     - Cause?
   - Soil drifts along fences or in fields
3. Attempts to check erosion

4. Ideas developed
   Meaning of topsoil and of subsoil
   Formation of soil
   Note: Nature makes one inch of topsoil in 400 to 1000 years. Wind or rain can carry it away in one storm.
   Soil erosion is the removal of soil by water or wind.
   Soil and water conservation are inseparable.
   Erosion can be checked.

IV. Soil erosion in the United States

1. Areas badly eroded
   Note: a. Have the "Challenging Fact" Number One and a map of the United States before each member of the group. Have a pupil prepared to show a map on which badly eroded areas are located.
   b. For the size of the area eroded consult pages 55 to 95 of *Soil Erosion, A Critical Problem in American Agriculture.*
   c. Develop the following ideas thru group discussion.
   What fractional part of the area of the United States is crop land?
   Each pupil can show the fact in a graf.
   What fractional part has been badly eroded?
   Show this on a graf.
   How can we get a clearer idea of the size of 200,000,000 acres?
   Find the number of acres in the home state.
   Find a number of states which together have an area of 200,000,000 acres.
   Where are these eroded areas?
   Are they mostly where the slopes are steep?
   Are they mostly where rainfall is heavy?
   Examine a physical and a rainfall map.
   Ideas developed
   Rich topsoil is being removed from large areas.
   Nature cannot restore it.
   Farms have been abandoned.
   Our desert area is increasing.
   "When the soil is gone, men go."
2. Rate of erosion
   Note: Have "Challenging Fact" Number Two before each member of the group. Develop ideas thru group discussion.

   What are the conditions that might cause variation in the rate of the erosion of the topsoil?
   List the causes

   Note: Have the following quotation before each member of the group, on mimeographed sheets or on the blackboard: "At the erosion experiment station at Zanesville, Ohio, on a 12 per cent slope, in a section with an average annual rainfall of 34.5 inches, measurements for a two-year period showed that 42.5 per cent of the total rain and snow falling on bare ground was lost as run-off per year. Where the land was planted continuously to corn, 35.2 per cent of the precipitation was lost as run-off, but on the same kind of land where a four-year rotation of corn, wheat, and 2 years of grass was practiced, the run-off amounted to only 18.4 per cent of the total fall of rain and snow. A bluegrass area of exactly the same kind of land lost only 4.5 per cent of the rainfall.

   Corresponding data on soil losses also were obtained. Fallow land kept bare

of all vegetation lost soil at the rate of 54.7 tons a year per acre and land devoted continuously to corn lost soil at the rate of 59.6 tons a year per acre. Where a four-year rotation was used, however, the annual soil loss was reduced to 8 tons an acre. The prevention of soil loss from land planted to bluegrass was even more striking. Under such protective cover, the annual rate of soil removal by erosion was cut down to the almost insignificant amount of 100 pounds an acre.

According to these measurements, it would require only twenty-one years to remove 7 inches of topsoil from the bare land, 19 years to remove 7 inches of topsoil from the land planted continuously to corn, 145 years for an equivalent soil removal from the land in crop rotation, and 23,200 years to strip the 7 inches of topsoil from land in bluegrass. (Pages 4, 5)

Similar measurements at the erosion experiment station near Bethany, Missouri, on Shelby loam soil occupying an 8 per cent slope give further indication of the value of conservation methods in reducing water run-off, as well as soil loss. During a 5-year period in which the average annual precipitation was 34.8 inches, 31.2 per cent of all the rain and snow falling on a fallow land was lost as run-off, while land planted to a mixture of bluegrass and timothy lost only 9.3 per cent of the total rainfall. Where a three-year rotation of corn, wheat, clover, and timothy was used, the water loss in immediate run-off amounted to 15.2 per cent of the total precipitation. Land planted continuously to corn lost 28.3 per cent of the precipitation.

The annual soil loss from fallow land was 112.8 tons an acre per year; from land in continuous corn, 68.8 tons; from land under rotation, 11.4 tons; and from land in grass, only 0.29 ton. According to these rates, it would take 3,910 years to remove 7 inches of topsoil from the land in grass, 99 years from rotated fields, 16 years from continuous corn, and only 10 years from land kept bare of vegetation." (Pages 6, 7)

From *Conservation Farming Practices and Flood Control*, U.S.D.A., Misc. Pub. 253.

Grafs of the above facts are in Fig. 3, Fig. 6.

Grafs of Soil Loss and Water Loss may be made by the group on the blackboard or each pupil may make his own graf.

List the physical factors given in the two reports from the experiment stations.

Comparing the factors, what do you conclude causes the differences in the loss of soil?

Note: An 8 per cent slope drops 8 feet in a horizontal distance of 100 feet. Have pupils determine the slope of a book or a card. A ruler is necessary.

Idea developed.

The loss of our rich topsoil is caused by man's use of the land.

3. Effects of water erosion

Gullies are formed.
Topsoil is removed by sheet erosion.
Rich fields of the lower lands are silted.
Reservoirs and ponds are filled.
Roads and bridges are washed out.
The water table is lowered, causing springs, wells, and artesian wells to fail.
Lakes and ponds become dry.
Irrigation reservoirs and channels are silted.

The rainfall run-off is increased.

4. Effects of wind erosion

V. Land treatment to save soil and water

1. Surveying and mapping the farm
2. Making a farm plan for soil conserving land use
3. Coordinating soil conserving land use practices

   What is meant by coordination of practices? Compare and contrast with earlier uncoordinated practices.
4. Soil conserving land use practices

   Woodlot management
   Pasture and range management
   Contour furrowing
   Grassed outlet channels
   Strip cropping
   Crop rotation
   Terracing
   Farm ponds

VI. Agencies at work saving our soils

1. Federal

   The Soil Conservation Service was established by an Act of Congress, April 27, 1935, as a scientific bureau of the government to coordinate all activities for the prevention and control of soil erosion.

   "Probably more than 150 different methods of land treatment and gully control are being employed to fit local conditions of soil, topography, climate, and type of agriculture."

   Forest Service
   The Civilian Conservation Corps
   The Tennessee Valley Authority
   The Agricultural Extension Service
   The Agricultural Adjustment Administration
2. State

   State Soil Conservation Districts Laws were passed in 22 states from January to October 1937. These laws permit farmers to petition for a special district election to vote upon the establishment of a soil conservation district. Thru these districts, for the first time, a democratic framework is established for cooperative action by local groups of farmers and ranchers which will lead to sound soil conserving land use practices. These local groups may call upon state and federal agencies for help in realizing their objective. Use of most of the arable land of the United States is controlled by 6,000,000 farmers and ranchers.

   State Extension Service
   Agricultural Experiment Stations
   Land Grant Colleges

VII. Suggestions for the study of the effects of erosion and of the treatment of land to save soil and water

1. Aim for vivid impressions of the effects of soil erosion and of the methods of land treatment to save the soil and water. Use pictures and examples in the locality.
2. Have each pupil make an individual study of some phase of the subject, give a report of it to the group, and be responsible for the answers of pertinent questions from the class.

   In addition to the topics listed in the outline, which pupils might choose,

there are maps, charts, and diagrams to be enlarged and explained to the group; pupil-made slides of diagrams and grafs, to prepare; and sand-pan models to be made of some features, like an 8 per cent slope and contour furrowing.

A group of four or five pupils might study the program and accomplishments of the Soil Conservation Service, and another group might study the progress that has been made in the State Soil Conservation Districts, or the work accomplished by the Civilian Conservation Corps Camps.

The pupils can accomplish much if the work is carefully planned and the materials are at hand.

3. A program for the School Assembly might be prepared from this study of soil erosion. It could take the form of a forum, or of a dramatic presentation, or of short talks to explain pictures, maps, diagrams, and grafs projected on a screen.
4. The length of time available for this study of soil erosion, and the age of the pupils will determine how much of the material suggested in this unit of study can be used.

VIII. Suggestions for additional work

1. History of Erosion

Erosion in foreign countries as contributing factors to destruction of ancient civilization and cities, the formation of foreign deserts as influenced by the destruction of vegetation, dust storms on the denuded areas, etc. (See *Man-made Deserts,* by W. C. Lowdermilk.)

Surface condition and vegetal cover in the United States at the time of colonization by the English. Discussion of the condition of the American continent when the English colonists cleared their first corn fields. (See *Soil Erosion and its Control in the United States.*)

Early erosion control practices: the present condition of the land after three centuries of agricultural exploitation. (See *Early Erosion Control Practices in Virginia* and *Soil Erosion and its Control in the United States.*)

2. Some Types of Erosion and Their Causes

Gullies—causes and effects

(See *Gullies: How to Control and Reclaim Them* and *Stop Gullies: Save Your Farm.*)

Depletion of plant food, loss of topsoil and soil fertility by improper farming practices. (See *Conservation Farming Practices and Flood Control, Erosion Control in the Northeast,* and *Soil Erosion: A National Menace.*)

Wind erosion—removal of grasses and other soil-binding vegetation, denudation and drought as contributing causes. (See *Future of the Great Plains, Soil Blowing and Dust Storms,* and *Soil Conservation Reconnaissance Survey of the Southern Great Plains Wind-erosion Area.*)

Erosion as a contributing factor to floods—effect of farming practices and removal of vegetation cover on excessive run-off. (See *Conservation Farming Practices and Flood Control, Effect of Cover on Surface Run-off and Erosion in the Loessial Uplands of Mississippi, Forests and Floods,* and *Relation of Soil Conservation to Control of Floods and Silting.*)

Sedimentation—relation to land-use practices and effects on reservoirs. (See *Little Waters: Their Use and Relations to the Land,* and *Silting of Reservoirs.*)

3. Land Treatment to Save Soil, Water, and to Conserve Wildlife

Gullies—prevention and control

(See *Gullies: How to Control and Reclaim Them, Stop Gullies: Save Your*

Farm, Use of Bluegrass Sod in the Control of Soil Erosion, and *Using Soil-Binding Plants to Reclaim Gullies in the South.*)

Maintenance and restoration of soil fertility
(See *Cover Crops for Soil Conservation, Erosion Control in the Northeast, Farm Terracing, Soil Productivity as Affected by Crop Rotation,* and *Strip Cropping for Soil Conservation.*)

Wind erosion—prevention and control
See *Blue Grama Grass for Erosion Control and Range Reseeding in the Great Plains and a Method of Obtaining Seed in Large Lots, Future of the Great Plains, Preventing Soil Blowing on the Southern Great Plains, Soil and Water Conservation in the Northern Great Plains, Implements and Tillage to Control Soil Blowing on the Northern Great Plains, Soil Blowing and Dust Storms, Soil Conservation Reconnaisance Survey of the Southern Great Plains Wind-erosion Area,* and *The Windbreak as a Farm Asset.*)

Floods—prevention and control
(See *Conservation Farming Practices and Flood Control, Effect of Cover on Surface Run-off and Erosion in the Loessial Uplands of Mississippi, Forests and Floods,* and *Little Waters: Their Use and Relations to the Land.*)

Prevention of excessive silting—erosion control practices to increase adsorption of water by the soil and to prevent excessive run-off
(See *Conservation Farming Practices and Flood Control, Cover Crops for Soil Conservation, Farm Terracing, Forests and Floods, Strip Cropping for Soil Conservation,* and *Use of Bluegrass Sod in the Control of Soil Erosion.*)

Wildlife conservation thru erosion control
(See *Groups of Plants Valuable for Wildlife Utilization and Erosion Control, Improving the Farm Environment for Wild Life,* and *Wildlife Conservation Through Erosion Control in the Piedmont.*)

IX. Sources for pictures
1. Slides owned by the school
2. Slides borrowed from government departments and from commercial companies
3. Motion picture films, 16 mm. Several have sections that vividly show erosion conditions.
4. Illustrations in pamphlets, magazines, books, and newspapers
5. A collection of mounted pictures, filed where they are accessible to pupils
Note: Two recent publications of the Soil Conservation Service contain excellent pictures. Two copies are needed. *Erosion Control in the Northeast* (20 pictures) *What is Soil Erosion?* (100 pictures) Decide upon a uniform card for all mountings. A convenient size is 8 inches by 10 inches. Mount the descriptive material on the back of the card for study.

X. Bibliography
Note: Unless otherwise indicated, these publications are available in limited quantities, on request, from the Section of Information, Soil Conservation Service, Washington, D.C.

**Soil Conservation,* the official monthly publication of the Soil Conservation Service, is available at 10¢ per copy or by subscription at $1.00 yearly from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. Book reviews and lists of new publications on soil and water conservation are included currently in this periodical.[1]

[1] New publications issued by all Bureaus of the Department of Agriculture are also listed in the *Monthly List of Publications* available from the U. S. Department of Agriculture, Washington, D.C.

Blue Grama Grass for Erosion Control and Range Reseeding in the Great Plains and a Method of Obtaining Seed in Large Lots. U. S. Department of Agriculture, Circular 402. July 1936. 5¢ per copy from the Superintendent of Documents, U. S. Government Printing Office.

*Conservation Farming Practices and Flood Control. U. S. Department of Agriture, Miscellaneous Publication 253. October 1936. 10¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Cover Crops for Soil Conservation. U. S. Department of Agriculture, Farmers' Bulletin 1758. July 1936.

Early Erosion-control Practices in Virginia. U. S. Department of Agriculture, Miscellaneous Publication 256. 1937. 10¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Effect of Cover on Surface Run-off and Erosion in the Loessial Uplands of Mississippi. U. S. Department of Agriculture, Circular 347. June 1935. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

*Erosion and Its Control in Oklahoma Territory. U. S. Department of Agriculture, Miscellaneous Publication 301. 1938.

*Erosion Control in the Northeast. (Describes and illustrates soil erosion and soil conservation in Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia.) Soil Conservation Service. 1937.

Farm Terracing. U. S. Department of Agriculture, Farmers' Bulletin 1669. Issued July 1931, revised March 1935. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Forests and Floods. U. S. Department of Agriculture, Circular 19. Issued January 1928, revised May 1931. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Future of the Great Plains. Report of the Great Plains Committee. House Document 144. 1937. 50¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Groups of Plants Valuable for Wildlife Utilization and Erosion Control. U. S. Department of Agriculture Circular 412. October 1936. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Gullies: How to Control and Reclaim Them. U. S. Department of Agriculture, Farmers' Bulletin 1234. Issued February 1922, revised January 1935. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Implements and Methods of Tillage to Control Soil Blowing on the Northern Great Plains. U. S. Department of Agriculture, Farmers' Bulletin 1797. January 1938. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Improving the Farm Environment for Wild Life. U. S. Department of Agriculture, Farmers' Bulletin 1719. January 1934. 5¢ per copy from Superintendent of Documents, U.S. Government Printing Office.

*Little Waters: Their Use and Relations to the Land. Soil Conservation Service, Resettlement Administration, and Rural Electrification Administration. Issued November 1935, revised April 1936. 15¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

*Management and Use of Agricultural Lands Including Farm Woods and Pastures. By H. H. Bennett. Soil Conservation Service. SCS-MP-13. September 1936.

Man-made Deserts. By Dr. W. C. Lowdermilk. Soil Conservation Service. SCS-

MP-4. April 3, 1936.

*Preventing Soil Blowing on the Southern Great Plains. U. S. Department of Agriculture, Farmers' Bulletin 1771. March 1937.

Relation of Soil Conservation to Control of Floods and Silting. By Dr. H. H. Bennett. Soil Conservation Service. SCS-MP-17. April 1937.

Silting of Reservoirs. U. S. Department of Agriculture, Technical Bulletin 524. July 1936. 40¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Soil and Water Conservation in the Northern Great Plains. (Describes and illustrates soil erosion and soil conservation in Montana, North Dakota, South Dakota, and Wyoming.) Soil Conservation Service. 1937.

*Soil and Water Conservation in the Pacific Northwest. (Describes and illustrates soil erosion and soil conservation in Idaho, Oregon, and Washington.) U. S. Department of Agriculture, Farmers' Bulletin 1773. July 1937.

Soil Blowing and Dust Storms. U. S. Department of Agriculture. Miscellaneous Publication 221. March 1935. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

*Soil Conservation Districts for Erosion Control. U. S. Department of Agriculture, Miscellaneous Publication 293. October 1937. 10¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Soil Conservation Reconnaissance Survey of the Southern Great Plains Wind-Erosion Area. U. S. Department of Agriculture, Technical Bulletin 556. January 1937. 25¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

*Soil Defense in the Piedmont. (Describes and illustrates soil erosion and soil conservation in Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Virginia.) January 1937. U. S. Department of Agriculture, Farmers' Bulletin 1767.

Soil Erosion: A Critical Problem in American Agriculture. Part V of the Supplementary Report of the Land Planning Committee to the National Resources Board. National Resources Board. Undated. 75¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Soil Erosion, A National Menace. U. S. Department of Agriculture, Circular 33. April 1928. 25¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

Soil Erosion and Its Control in the United States. By Dr. W. C. Lowdermilk. Soil Conservation Service. SCS-MP-3. November 1, 1935.

Soil Productivity as Affected by Crop Rotation. U. S. Department of Agriculture, Farmers' Bulletin 1475. May 1926. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

*Stop Gullies: Save Your Farm. U. S. Department of Agriculture, Farmers' Bulletin 1737. September 1934. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

*Strip Cropping for Soil Conservation. U. S. Department of Agriculture, Farmers' Bulletin 1776. June 1937.

Use of Bluegrass Sod in the Control of Soil Erosion. U. S. Department of Agriculture, Farmers' Bulletin 1760. October 1936.

Using Soil-Binding Plants to Reclaim Gullies in the South. U. S. Department of Agriculture, Farmers' Bulletin 1697. January 1933. 5¢ per copy from Superintendent

of Documents, U. S. Government Printing Office.

*What is Soil Erosion? U. S. Department of Agriculture, Miscellaneous Publication 286. 1938.

Wildlife Conservation Through Erosion Control in the Piedmont. U. S. Department of Agriculture, Farmers' Bulletin 1788. November 1937.

The Windbreak as a Farm Asset. U. S. Department of Agriculture, Farmers' Bulletin 1405. Issued January 1924, revised November 1936. 5¢ per copy from Superintendent of Documents, U. S. Government Printing Office.

XI. Addresses

1. Section of Information,
   Soil Conservation Service,
   U.S. Department of Agriculture,
   Washington, D.C.
2. Superintendent of Documents,
   United States Printing Office,
   Washington, D.C.
3. Office of Information,
   United States Department of Agriculture,
   Washington, D.C.
4. Regional Headquarters,
   Soil Conservation Service,
   U. S. Department of Agriculture.
   - Williamsport, Pa.
   - Spartanburg, S.C.
   - Dayton, Ohio
   - Fort Worth, Texas.
   - Des Moines, Iowa.
   - Amarillo, Texas.
   - Salina, Kan.
   - Albuquerque, New Mexico.
   - Rapid City, S.D.
   - Santa Paula, Calif.
   - Spokane, Wash.

Appreciative acknowledgment is made to the Soil Conservation Service for aid with material and information in the preparation of this study.

Teachers may send to Helen M. Strong, Educational Relations, Soil Conservation Service, Washington, D.C., for facts regarding soil conservation to be used in their teaching work.

*Important references.

ILLUSTRATIVE MATERIALS FOR CONSERVATION EDUCATION. I. PICTURES, CHARTS AND POSTERS

W. H. HARTLEY
State College for Teachers
Towson, Maryland

The various aspects of the study of the conservation of our natural resources lend themselves peculiarly well to visual presentation. It is extremely difficult for the young pupil to comprehend, from a purely verbal description, the meaning and importance of such concepts as contour plowing, terracing, or the use of check-dams. Fortunately there is available a quantity of attractive, effective, and fairly inexpensive illustrative material which can be used to present conservational concepts in a realistic fashion. Among the many aids which may be utilized by the teacher are flat pictures, charts, graphs, posters, slides, transparencies, objects, specimens, models, maps, globes, cartoons, and motion pictures.

The large amount of picture material which may be obtained to illustrate the need for conservation and the steps being taken to meet this need, is overwhelming. Each issue of *Life, Look, Fortune, Building America, Scribners, National Geographic, Nature,* and similar magazines contain pictures which may be used to illustrate some phase of conservation. The alert teacher will build up over the years a collection of these pictures, carefully mounted, catalogued, and filed. Just a word about mounting. Use a good quality mounting paper of a neutral or contrasting shade, and affix the picture firmly but artistically with paper cement, scotch tape or dry mounting tissue (obtainable at any photographic supply shop). Select a standard size mounting paper, 8 by 10 inches for standard size file, or 11 by 14 inches if you have a legal size file. Any picture worth keeping is worth mounting, and the best time to mount a picture is the minute you have discovered and clipped it. By making a practice of mounting all pictures of lasting value, a good usable collection may soon be built up which will have an attractive appearance as contrasted to the dog-eared, worn and torn pictures which too often disgrace our bulletin-boards. Start your students on the search for this type of material; it is a worth-while educational activity for them and the picture file will be *theirs.*

Another valuable source of pictures lies in the many excellent

government publications which are available to schools free of charge or at low cost. Profusely illustrated, these pamphlets clarify ideas otherwise extremely difficult to grasp. In most instances it will pay to secure several copies of the better illustrated pamphlets. Keep one in the classroom library and clip and mount the pictures in the other pamphlet.

Another source of illustrative material is the commercial firms which provide classroom teachers with sets of pictures especially designed for school use. These pictures are usually reasonably priced and by judicious purchasing a useful supply of pictures may soon be obtained. Governmental agencies also provide sets of pictures under certain conditions. They are usually excellent.

What is the best way to use these pictures in teaching conservation? The answer to this question depends somewhat upon the local situation, the grade level, interest, background, and abilities of the pupils. Some of the ways in which picture collections have been used are: first, pass the pictures around, have the pupils examine them and then discuss the findings. A word of warning here may not be amiss. If pictures are passed around, have enough pictures on hand so that each pupil or each two pupils may have a picture to examine. Devote a part of the class period to this exercise. Don't try to carry on a class discussion while the pictures are being examined, or the class will be divided in its interest, and neither the discussion nor the examination will be satisfactory. While the pictures are being studied the teacher may walk about the room, quietly discussing with individual pupils the information to be found in the picture.

Another effective way of using pictures is to post them on the bulletin-board or use them as room decorations. Students should always be held responsible for information contained in pictures so posted. A bulletin-board committee should be appointed to arrange the pictures, and to call attention to this material. The same pictures may be taken from the bulletin-board and displayed before the class. When a picture is too small for the class to see it from the front of the room it may be placed in the opaque projector and flashed on the screen for group discussion. A thoroly darkened room is necessary for efficient projection with opaque projectors.

There are many other uses which the teacher may make of pictorial material. Individual scrapbooks and classbooks may utilize such pictures. Students may use pictures to illustrate their floor-

talks. The writer found that pictures could effectively be used to test the accuracy of the conservational ideas of the pupils. A number of large pictures, which could be seen clearly by each member of the class, were numbered and displayed around the room. A question was asked concerning each picture, and the pupils were tested according to their ability to recognize types of erosion, methods of checking erosion, flood control practices, and the like. The pupils seemed to enjoy this type of test and the results were very enlightening.

One difficulty in obtaining suitable pictures lies in the fact that they are scattered among a wide variety of sources. Tracking down the picture you want is not always easy. To aid the teacher in this task, the following list of sources has been compiled. From these agencies one may obtain material on our forests, soil, minerals, water resources, and wildlife. In each instance a brief annotation calls attention to the type of material available from each source, its general nature, and the terms under which it may be acquired. Inclusion in this list does not necessarily imply approval, nor does omission imply condemnation.

PICTURES—COMMERCIAL SOURCES

Artex Prints, Westport, Conn.

Color Reproductions. Direct color reproductions of art masterpieces. A few, not many, suitable for illustrating the beauties of nature. Artex Prints 7 by 9 inches, 50 cents; 10 by 12, 80 cents; postcards 4 by 6, 10 cents each. Artex Junior prints 3 by 4 inches, $2.00 per hundred.

Creative Education Society, Mankato, Minn.

Visualized Curriculum Series. 8½ by 11 inches. Teaching pictures with text and questions on the back. With teacher's manual, $10.00 per set. Excellent. Problem 6—"Conservation—Human Resources." 92 pictures. Problem 7—"Conservation—Natural Resources." 119 pictures.

Joseph H. Dodson, Inc., Kankakee, Ill.

Bird and Nature Pictures. Full color. 7 by 9 inches, 3 cents each. Selection of over 1,000 prints.

Industrial Pictures. Size 6 by 9 inches. "Lumbering," 12 pictures, 25 cents. "Paper," 20 pictures, 50 cents.

Geo-Aero-Photo, P. O. Box 750, Oklahoma City, Okla.

Third Dimensional Aerial Photos. Complete with spectacles. Set of ten views of geologic and geographic features of the west, $5.00 per set.

General Electric Co., Publicity Dept., Schenectady, N.Y.

Production and Uses of Electricity. 15 by 10½ inch colored pictures, free. "Conserving our Natural Resources," "Bringing water to the Thirsty Soil," "Colorado Aqueduct."

Informative Classroom Picture Publishers, 48 North Division Ave., Grand Rapids, Mich.

The Farm. A series of 21 black and white drawings, each 8½ by 11 inches, showing types of farms and farm activities. Pictures and accompanying text are designed for early elementary grades. Price $2.80 per set.

Liberty Bell Bird Club, Washington Square Farm Journal, Philadelphia, Pa.
Bird Pictures. Five 7 by 9 inch pictures to the set, 10 cents per set.

National Association of Audubon Societies, 1006 Fifth Ave., New York, N.Y.
Bird Cards. Write for full list. Also bird charts. National Geographic Society, School Service Dept., Washington, D.C.
Separate Color Sheets. Color sheets identical with those bound in certain back numbers of the *National Geographic Magazine*. Ninety-six sheets will be furnished, postage prepaid, for 50 cents. Purchase price must accompany order. Illustrations are on both sides of the sheet. Write for a list of the pictures available.
Back Issues of National Geographic Magazine. Limited number available for educational use. Ten for $1.00, post paid.
Pictures for Wall Display. "The Oldest Living Thing" (General Sherman Tree in Sequoia Park), green gravure, 9⅝ by 23 inches; "Hark" (Wild Buck), woodland sepia, 11¾ by 8⅛ inches; "Doe and Twin Fawns", woodland sepia, 11¾ by 8⅛ inches, 50 cents each. "The Land, the Water, the Air," set of 48 pictures with accompanying text, each 9 by 11 inches, 50 cents per set.

A. J. Nystrom and Co., 33333 Elston Ave., Chicago, Ill.
Atwood Pictures. Sixteen pictures, each 20 by 15 inches, showing natural regions and man's activities in relation to them. Earth's surface divided into four natural regions: rugged mountains, worn-down mountains, uplands, lowlands. Complete set, mounted one on each side of eight durable cardboard panels, $8.00.
Fairgrieve Geography Pictures. Each picture 6 by 4 inches. Printed in gravure on one side of sheet, two pictures to a sheet, 8½ by 11. Set of 64 pictures, 75 cents. Postage 15 cents.

F. A. Owens Publishing Co., Dansville, N.Y.
Illustrated Units. Based on the illustrated units which have appeared in *The Instructor* magazine. Unit consists of an eight page pamphlet of text material, and a picture folio, size 12¾ by 9¾ inches. Picture pages have no printed material on the back so they may be mounted, cut out, and displayed. Price 25 cents each for four units or more, 30 cents each for four units or more, No. 3, "Animals"; No. 32, "Birds"; No. 13, "Fishing"; No. 47, "National Parks"; No. 16, "Natural Resources"; No. 5, "Rocks and Minerals"; No. 28, "Sea Creatures"; No. 9, "Trees"; No. 36, "Wild Flowers."

Perry Pictures Co., Malden, Mass.
Pictures of Forest Trees. Three sets of pictures, each 9 by 12 inches. Eight sheets to a set. Each sheet has a picture of the tree, a section of the trunk, and a spray of leaves. 50 cents per set.
Birds, Animals, and Minerals in Natural Colors. A selection of about 500 pictures, each 7 by 9 inches. Three cents each for twenty or more.

Wild Flower Preservation Society Inc., 3740 Oliver St., Washington, D.C.
Wild Flower Color Plates. Post cards, set of twelve 27 cents. Drawings 6 by 9 inch for coloring, one cent each. Set of forty state flowers, 40 cents. Yellowstone Park wild flowers, twelve postcards, 25 cents.
Gummed Pictures. For notebooks or wall charts, 2 by 3 inches. Set of 64 spring and summer wild flowers, 55 cents; 48 trees, 80 cents; 72 common birds, 80 cents.

GOVERNMENT PICTURES

Chief Photographer, Soil Conservation Service, Washington, D.C.
Photographs. The Soil Conservation Service has a collection of over 85,000 pictures showing types of soil erosion, soil conservation practices, water conservation, flood control, land utilization, and wildlife conservation. Write for price list, or write to your Regional Office of the Soil Conservation Service for photographs available on

loan. They are *excellent*.

Office of Information, U. S. Department of Agriculture, Washington, D.C.
Photographs. Reproductions of photographs which have been obtained in connection with the authorized work of the U. S. Department of Agriculture may be purchased from the department. All inquiries should be addressed to the bureau which issued the material from which reproductions are to be made. If issuing bureau is not known, write to the above address.

U. S. Department of the Interior, Grazing Service, P.O. Box 659, Salt Lake City, Uta'
Photographs. This office maintains a photographic file from which may be drawn pictures relating to the range livestock industry. Send specific request.

Office of Plant and Operations, U. S. Department of Agriculture, Washington, D.C.
Aerial Photographic Reproductions. The Agricultural Adjustment Administration, Forest Service, and Soil Conservation Service have aerial photographic laboratories which may furnish reproductions subject to certain exceptions and restrictions. Orders may be taken by County Agricultural Conservation Associations, and local offices of the Forest Service, and Soil Conservation Service. If your local office cannot supply the picture write to the above address.

POSTERS AND CHARTS

The American Forestry Association, Washington, D.C.
"Six Rules for Preventing Fires in the Forest." Free.

Chicago Apparatus Co., 1735 North Ashland Ave., Chicago, Ill.
Visual Rock and Mineral Sets. Specimens mounted on 14 and 27 inch corrugated board. Complete with information about each rock and man's dependence upon it.
No. 24868 "Visual Rock Charts." Five in set, $29.75.
No. 24867 "Standard Rock Chart." Four in set, $15.00.

The Forest Service, U. S. Department of Agriculture, Washington, D.C.
Posters. In color. Free. "How a Tree Grows," "Yours in Trust," "Your Forests," "Your Fault, Your Loss."

General Biological Supply House, 761-763 East 69th Place, Chicago, Ill.
390D30 "Audubon Bird Charts." Four charts, each with pictures of our most common birds. Each $2.50.
390D70 "Nieland Tree Chart." Two disks attached together, spin upper disk to find principle facts about common trees. Each $1.00.
WC 63 "Wheat Rust." Complete Life History. Size 30 by 40 inches, $1.50.

Museum Extension Project, Works Progress Administration, 69-71 Belmont Ave., Newark, N.J.
Charts. Pictorial charts of plant and animal life. Black and white, 30 by 40 inches, 50 cents each.

National Fertilizer Association, 616 Investment Bldg., Washington, D.C.
Charts. 20 charts on fertilizers and good farming. Free.

National Forum, 421 West 118th St., New York City; or 417 Dearborn St., Chicago, Ill.
Farm Problems Visualized. A pictorial chart for wall display, 70 cents each. Write for list of additional charts which are issued monthly. Posters are available at 40 cents each.

A. J. Nystrom Co., 33333 Elston Ave., Chicago, Ill.
Hughes Citizenship Charts. Hand mounted on muslin, 50 by 28 inches. Each $3.00 to $6.00 depending upon mounting.
HC 8 "Natural Resources"
HC 9 "Important Raw Materials Used in American Industries"

Pictorial Statistics, Inc., 142 Lexington Ave., New York, N.Y.
Pictorial Charts. Each 8½ by 11 inches, 20 cents each.

"Erosion and Production Per Acre"
"Extent of Erosion in U. S., 1492-1935"
"How Plant Foods Are Lost"
"Natural Resources, Leading Producing States"
"Role of Forests"
"Soil Losses Through Cultivation"

Soil Conservation Service, U. S. Department of Agriculture, Washington, D.C.

Conservation Charts. This series of charts was prepared by the Soil Conservation Service for educational purposes. *Free* distribution is restricted to schools and colleges. Address your requests to national headquarters or to the Regional Soil Conservation Office nearest you. Regional offices are located at Upper Derby, Pa.; Spartansburg, S.C.; Dayton, Ohio; Fort Worth, Tex.; Milwaukee, Wis.; Amarillo, Tex.; Lincoln, Neb.; Albuquerque, N.M.; Spokane, Wash.; Berkeley, Calif.

National Conservation Problems. Each 19 by 24 inches in size.

1. "Soil Erosion, Cause and Effect"
2. "Contour Farming for Soil and Water Conservation"
3. "Strip Cropping, An Erosion Control Practice"
4. "Terraces for Erosion Control"
5. "Cover Crops Protect Soil"
6. "Gully Control"
7. "Saving Soil and Water on Pasture Land"
8. "Trees and Shrubs for Erosion Control"
9. "Wildlife, A Safe Use for Erodible Land"
10. "Farm Ponds"

Regional Conservation Charts. Each 36 by 36 inches. Based on Soil Conservation Service program in upper Mississippi Region, including Iowa, Illinois, Missouri, Minnesota, and Wisconsin.

11. "Soil Management Program for Cropland"
12. "Effect of Cropping Plan on Soil Losses"
13. "Story of Three Corn Fields and the Soil They Lost Each Year"
14. "Improve Pastures, Safeguard Soil, Produce More Protein"
15. "Financial Insecurity Follows Erosion of Soil"
16. "Erosion Control Starts with an Inventory of Farm Resources"
17. "Soil Conservation Calls for Long Time Planning"

Regional Conservation Charts—Continued. This series of charts is based upon work in the Ohio Valley, including, Indiana, Kentucky, Michigan, Ohio, and Tennessee.

18. "Locust Reclaims Gullied Areas Within Three Growing Seasons"
19. "Contour Furrows"
20. "Winter Cover Saves Soil"
21. "Soil Erosion Destroyed This Community"

Regional Conservation Charts—Continued. This series of charts, each 19 by 24 inches, is based upon work done in the Southern Great Plains region, which includes the state of Kansas, the Panhandle areas of Oklahoma, and Texas, the extreme eastern section of New Mexico, and eastern Colorado.

22. "Wind Erosion in the Great Plains"
23. "Vegetative Cover for Wind Erosion"
24. "Water Conservation in the Great Plains"
25. "Conserving Range Lands of the Great Plains"

Regional Charts—Continued. The following charts are based on the Soil Conservation work in the Pacific Southwest region, which includes the States of California and Nevada.

26. "Hillside Orchards Need Cover to Protect Soil from Erosion"
27. "Trees Conserve Soil and Water"

Superintendent of Documents, Government Printing Office, Washington, D.C.
Educational Charts on Agriculture. Each 12 by 15 inches. Single charts 5 cents, 100 charts, $2.00.
7.70 "Furniture Woods"
7.77 "How Lumber May Be Cut"
8.10 "A Well-Planned Farm Food Supply"

Teaching Material Service, 205 East 42nd St., New York City
Forest Conservation and Harvard Forest Models. Chart 38 by 25 inches. Series of pictures on tree enemies, preservation of forests, and value of trees. Price 50 cents.

Tennessee Valley Authority, Knoxville, Tenn.
"Pictorial Profile of Tennessee Valley." Free.

U. S. Bureau of Reclamation, Washington, D.C.
Chart. "Boulder Dam and Power Plant." Size 10 by 8 inches.

Wild Flower Preservation Society Inc., 3740 Oliver St., Washington, D.C.
Posters.
"Holley, Laurel and Ground Pine," 10 cents each
"Leave the Dogwood for Others to Enjoy," 3 cents each
"Spare the Flowers," and "Outdoor Code," 2 for 5 cents
"Will You Help Protect Rare Wild Flowers?," 3 for 5 cents

TRAVEL POSTERS

NOTE: Posters showing America's beauty spots, in color, may be obtained from the following sources. There is usually a charge for these posters, but this charge is sometimes waived if the posters are to be prominently displayed. Write to the listed sources concerning the available posters and the terms of their distribution.

Baltimore-Ohio Railroad, Baltimore, Md.
Bureau of State Publicity, Conservation Dept., Albany, N.Y.
Chamber of Commerce, Los Angeles, Calif.
Greater North Dakota Association, Fargo, N.D.
Minnesota Tourist Bureau, 349 State Office Bldg., St. Paul, Minn.
Mississippi Advertising Commission, Jackson, Miss.
Montanans Inc., Helena, Mont.
New Hampshire State Development Commission, 17 Capital, Concord, N.H.
New Mexico State Tourist Bureau, State Capital, Santa Fe, N.M.
North Carolina State Conservation Dept., Raleigh, N.C.
On-to-Oregon, Portland, Ore.
Southern Pacific Lines, San Francisco, Calif.
Southern Railway System, Passenger Traffic, Manager, Washington, D.C.
State of Michigan, Tourist Bureau, Lansing, Mich.
State of Tennessee Information Dept., 426 N. 6th Ave., Nashville, Tenn.
Vermont, Dept. of Conservation and Development, Montpelier, Vt.
Virginia State Conservation, State House, Richmond, Va.
Spokane Chamber of Commerce, Spokane, Wash.

PICTURES AND CHARTS FROM STATE AGENCIES

NOTE: The following agencies distribute materials suitable for school use to schools within the state boundaries. Write directly to the agency concerned for full particulars.

Arkansas Geological Survey, 447 State Capitol, Little Rock, Ark.
California State Division of Mines, Department of Natural Resources, Ferry Building, San Francisco, Calif.

Delaware State Board of Game and Fish Commissioners, Dover, Del.
Montana State Planning Board, Helena, Mont.
New Jersey State Museum, Trenton, N.J.
Oklahoma Geological Survey, Norman, Okla.
Oregon State System of Higher Education, Dept. of Higher Education, Dept. of Visual Instruction, Corvallis, Ore.
Tennessee State Department of Conservation, 310 State Office Building, Nashville, Tenn.
Wisconsin State Department of Public Instruction, Madison, Wis.

ILLUSTRATIVE MATERIAL FOR CONSERVATION EDUCATION. V. MAPS

W. H. HARTLEY
State College for Teachers
Towson, Maryland

The location of our resources and of certain evidence of their use and misuse is most important in conservation education. A large amount of effective map material is available, much of it at reasonable prices. This material varies in size, format and usefulness. Some of the maps are designed for use by the entire class, others are suited to individual projects. There are slated maps which may be written upon with chalk; there are cellophane covered maps which may be marked with crayon; there are map stencils with which outline maps may be drawn on the blackboard. The basis of the map collection is, of course, the muslin-backed wall map, and the student outline maps. The map to be selected should be the one which best fits the need of the class and the study at hand. The following source list should aid in the selection of suitable maps for conservation education.

LIST OF MAP SOURCES

American Airlines Inc., 20 N. Wacker Drive, Chicago, Ill.
Time Zone Map of the United States. Free.

Coast and Geodetic Survey, Washington, D.C.
Large scale maps, compiled from air photographs, are available for certain areas along the coasts of the United States. In your inquiry, state the region in which you are interested. Index sheets illustrating and describing these maps are free.
Alaska. Size 24 x 46 inches, scale 1:1,000,000. 40 cents.
North Atlantic Ocean. Size 24 x 46 inches, 75 cents.
North Pacific Ocean. Size 14 x 41 inches, 25 cents.
Outline Map of the United States. Size 21 x 26 inches, 20 cents.

Denoyer-Geppert Co., 5335 Ravenswood Ave., Chicago, Ill.
Physical-Political Maps.
SS1-rp United States, 86 x 58 inches, $10.75 to $19.75.
S1-arp United States, 64 x 44 inches, $5.75 to $10.00.

S1-ar U.S. (Physical names emphasized) 64 x 44 inches, $5.75 to $10.00.

CS16 Slated U.S. Physical areas in extra black print, water areas in blue, 64 x 50 inches, $7.75. With world on reverse side, $10.75.

State and Regional Maps. Physical-political. Write concerning area in which interested. $6.25 to $9.00.

Phillips' Comparative Wall Atlas Maps. For human and regional geography. Each map 44 x 36 inches. Price $3.75 to $9.00.

P90 World, Annual Rainfall
P9v World, Natural Vegetation
PA8 Resources and Industries of the United States
P1v U.S., Natural Vegetation
P1s U.S., Summer Climate
P1w U.S., Winter Climate
A20 U.S., Resources and Conservation
A22 U.S., Agricultural

Re-mark-able Wall Outline Maps. Mark on them with crayon, wipe off, use again. Size 44 x 32 inches, two maps to a panel, printed back to back, $5.95.

Desk Outline Maps. Three styles; plain, sea tinted blue, and with mountains. Size 8½ x 11, 2 cents each; 11 x 16, 3 cents each; 16 x 22, 5 cents each.

Paper Wall Outline Maps. Lithographed blue on white, 48 x 36 inches, 25 cents each.

The George F, Cram Co., Inc., Indianapolis, Ind.

No. CSP1—*United States.* Physical-political wall map, 51 inches wide. $7.00 to $10.00.

No. CU1—*United States Unlettered Colored Outline Wall Map.* May be written upon with ink, water color, or special map-marking pencils. Marking may be removed with damp, soapy cloth. 51 inches wide. $5.00 to $8.00.

No. CN 1-5 *Comprehensive Series Maps.* Markable. $6.00 to $8.00.

CN1 United States, Natural Resources
CN2 United States, Mineral Resources
CN3 United States, Agricultural Resources
CN4 United States, Agricultural Products
CN5 United States, Manufacturing Industries

No. ZP *Reverso Panel Maps.* Colored outline maps mounted on panel boards, 38 x 44 inches. Take ink, water color, and map-marking pencils. Mounted two maps to a panel. United States on one side and South America on the other. Price $6.85.

The Forest Service, U.S. Department of Agriculture, Washington, D.C.

Requests for material should be addressed to the regional forester nearest you, or to the Washington office. Teachers are requested not to ask individual pupils to write for publications. If material is desired for class work the teacher may write for the whole class.

Natural Forest Regions of the United States. Colored, 18 x 24. Free.

Friendship Press, 150 Fifth Ave., New York, N.Y.

Picture Maps. 30 x 50 inches. Accompanied by insert sheet of 20 small sketches to be cut out and pasted on map. North America, United States; 50 cents each.

Game, Reforestation and Park Commission, Lincoln, Neb.

Full Picture Map of Nebraska. Free.

Geological Survey, Washington, D.C.

Write direct to the above address for information concerning topographical maps of your community, maps are 10 cents each.

Geologic Map of the United States. Scale 1:2,500,000. 4 sheets, each 27 x 47 inches, may be trimmed and pasted to make a single sheet 51 x 90 inches. Set, $2.50.

Geographic Features of the United States. Set of 25 maps that illustrate an interesting variety of geographic features. Set, $1.00.

Contour Maps that Illustrate Specific Physiographic Features. 100 select maps, $6.00.

Information Division, U.S. Bureau of Mines, Washington, D.C.

Map. Value of 1928 mine production of gold, silver, copper, lead, zinc, and iron ore of the United States by districts yielding $100,000 or more. Free.

McKinley Publishing Co., 809-811 North 19th St., Philadelphia, Pa.

Desk Outline Maps. Size 7½ x 10, 65 cents per 100; 10 x 15, $1.30 per 100; 15 x 20, $2.75 per 100.

Wall Outline Maps. Size 32 x 48 inches, 40 cents each.

Milton Bradley Co., 399 Codwise Ave., New Brunswick, N.J.

Blackboard Stencil Maps. 24 x 36 inches. 10 cents each. Available for each state; also for United States.

Bradley's Outline Maps. Size 11 x 14 inches; 60 cents for 50.

Mississippi River Commission, P.O. Box 80, Vicksburg, Miss.

Folder of 63 sheets, scale 1 inch to 1 mile covering Mississippi from Cairo, Ill. to Gulf of Mexico, 75 cents for folder.

National Geographic Society, School Service Department, Washington, D.C.

United States. Ten color wall map, 40 x 26 inches, shows towns, highways, railways, national parks, rivers, etc. 50 cents.

North America. Similar to above, but 28 x 38 inches. 50 cents.

A. J. Nystrom & Co., 3333 Elston Ave., Chicago, Ill.

Atwood Regional-Political Series. Size 52 x 60 inches. $8.00 to $11.25.

Parkins Series—Relief Like. Each 65 x 58 inches. Give perspective of dominant features of the earth. $9.75 to $13 50.

Finch Series. Environment shown by color layers symbolizing the surface features. $5.75 to $10.00.

Popular Series. Low cost political map. $2.00 on common roller.

Paper Wall Outline Maps. Lithographed on tough paper. Size 42 x 32 inches, 25 cents each.

Nystrom Desk Outline Maps. 8 x 10 inches, 1½ cents each; 10½ x 15, 2½ cents each. Maps include: weather, drainage, rainfall, and contour.

Gibsons Climatic Map of United States. Shows average monthly precipitation, mean annual precipitation, mean monthly temperature, mean annual temperature, prevailing winds. Size 65 x 45 inches, price $8.00 to $11.00 depending on mounting desired.

Economic Maps. For advanced pupils. Size 35 x 45 inches, price $3.00 to $7.25.

Hughes Natural Resources

North America—Rainfall and Temperature

World—Land Utilization

Erasamark White-Board Wall Outline Map. Markable maps each 42 x 32 inches. Use special color crayon. (25 cents for box of assorted colors) Mounted on Panels, two maps back to back on each panel. Each panel with two maps, $4.75. Come in the following combinations: United States-World, North America-South America, United States-Europe.

Rand McNally and Company, 111 Eighth Ave., New York, N.Y.

Ranally Physical-Political Series. Each 40 x 56 inches, $4.25 to $6.50.

Erasable Surface Outline Map. Takes crayon, water color, poster paints, India ink. Wipes off with a damp cloth. Size 40 x 30 inches, $3.00.

EOAW 101—United States

EOAW 100—North America

REOAW 906—U.S. and World (back to back, $4.50)

Blackboard Outline Map. Takes soft chalk. Size 46 x 66 inches, $6.00. World and United States, back to back, $8.00.

Wall Outline Maps. Size 40 x 30 inches, printed on tough paper. Each 35 cents.

Available for world, United States, and North America.

Desk Outline Maps. Three sizes; 8½ x 11, 2 cents each; 11 x 14½, 3 cents each; 19½ x 11 inches, 5 cents.

Stanley Bowmar Co., 2929 Broadway, New York, N.Y.

Picture Maps. Collected from various publishers. First price is for map printed on plain sheet, second price is for map on muslin with plain rods at top and bottom.

Alaska, Last Frontier, 23 x 21, $1.00, $2.75
Cape Cod, 28 x 26, $1.50, $3.25
Conquest of a Continent, 24 x 18, $1.50, $2.75
Nation's Resources, 17 x 25, $1.00, $2.25
United States, 25 x 19, $1.00, $2.50

Superintendent of Documents, United States Government Printing Office, Washington, D.C.

Send for price list No. 53 Maps, for complete list of Government maps. Orders for these maps with money order, cash or check should be sent to the above address.

A 1.2:ag 8/5 *Geography of World's Agriculture*. $1.00.

A 36.37/2:f 22 *Farm Land*. Value of farm land and buildings. 10 cents.

A 13.28:f 76/2/937 *Forest Regions of the United States*. 5 cents.

C 3.61 *Land Office Maps*. Maps available for each state. 20 x 27. 10 cents each.

A 1.36:556/maps *Soil Conservation Survey Maps and Summarized Erosion Map of Southern Great Plains*. 21 maps. $1.50 the set.

I 21.13:Un 34/936 *Outline Map of United States*. 30 x 45 inches. 25 cents.

Official Map of the United States. 7 x 5 feet. $2.00.

Tennessee Valley Authority, Knoxville, Tennessee

Map of Tennessee Valley. Free.

Weber Costello Co. Chicago Heights, Ill.

Desk Outline Maps. Two sizes: 8½ x 11, 2 cents each; 11 x 16, 3 cents each.

STATE GOVERNMENT DEPARTMENTS AND AGENCIES

The following agencies distribute maps within their boundaries. Those outside these boundaries may usually obtain these maps at a nominal figure.

Arkansas Geological Survey, 477 State Capitol, Little Rock, Ark.
Delaware State Board of Fish and Game Commissioners, Dover, Del.
Iowa State Conservation Commission, Des Moines, Iowa
Michigan Department of Conservation, Lansing, Mich.
Montana State Planning Commission, Helena, Mont.
Nevada State Engineer, Carson City, Nev.
New Hampshire Forestry and Recreation Dept., Concord, N.H.
New York State Conservation Dept., Arcade Bldg., Albany, N.Y.
Oklahoma Geological Survey, Norman, Okla.
Pennsylvania Department of Forests and Waters, Harrisburg, Pa.
Tennessee State Department of Conservation, 310 State Office Building, Nashville, Tenn.
West Virginia Conservation Commission, Charleston, W.Va.
Wisconsin State Department of Public Instruction, Madison, Wis.

ILLUSTRATIVE MATERIAL FOR CONSERVATION EDUCATION. IV. OBJECTS, SPECIMENS, MODELS

W. H. HARTLEY
State College for Teachers
Towson, Maryland

One of the best ways to familiarize pupils with the nature of their environment and its resources is to take them out of the classroom to examine certain aspects of nature. This is not always convenient or possible. It is possible in many instances to bring samples of nature's gifts into the classroom. It is even possible, thru the use of models, to have cross sections of the terrain where they may be examined at close hand. Science teachers have long made use of this method and much of the material they have had prepared may be utilized by social science teachers.

An excellent source of objective material is the local or state museum. The educational departments of many museums now have regular lending services to the schools, and teachers may obtain much material to vitalize their instruction. A list of sources of this type of material will be found below.

Many schools are acquiring objects, specimens and models as a part of their collection of permanent teaching material. Out of such efforts have grown school and classroom museums. These small museums will be increasingly effective as those responsible for them keep their material well labeled, stored and indexed. To assist schools in building up such collections, and in obtaining loan materials to augment their own collections, the following source list should prove useful.

American Museum of Natural History, Central Park West at 79th St., New York, N.Y. The sample cases listed below are available to schools, colleges and other responsible groups at the rates noted. The rental fee entitles the borrower to the use of the material for one week including the time required for transportation to and from the museum. The borrower is expected to pay transportation costs both ways in addition to the regular rental fee. The average case weighs about 20 pounds.

- No. C-8 *Oil.* By a series of drawings and samples this case shows the origin, source, and steps in the refining of crude oil. Rental $1 00.
- No. C-9 *Paper.* Case showing the process of manufacture of paper from wood pulp. Rental $1.00.
- No. C-10 *Rayon.* Shows the process of manufacture of rayon. Rental $1.00.
- No. H-24 *Birds That Are Our Friends.* Includes stuffed screech-owl, cuckoo, goldfinch, and bob-white. Rental $1.50.
- No. C-47 *Minerals and Rocks.* Contains 15 specimens of common rocks and ores. Rental $1.00.

No. C-48 *Minerals*. Contains 25 specimens of common ores and precious metals. Rental $1.00.

No. C-49 *How Rocks Form*. Shows relation of sedimentary rocks to their metamorphic equivalents. Rental $1.00.

General Biological Supply House, 761-763 East 69th Place, Chicago, Ill.

25 4 722 *Sets of Hardwoods and Softwoods*. Labeled specimens of all the principal lumber woods found in the United States. 48 specimens, each piece 2¼ x 5 x ½ inches. Price $5.95.

340 D 972 *Rocks and Minerals*. 16 specimens, $2.50.

340 D 97 *Rocks and Minerals*. 20 rocks and 20 minerals. $6.00.

340 D 974 *Rocks and Minerals*. 30 labeled specimens. $1.00.

Museum Extension Project, Works Progress Administration, 69-71 Belmont Ave., Newark, N.J.

Models. Authentic plaster cast and wooden models. Shipping costs are paid by purchaser.

M-1 *American Farm*, 18 x 24 x 2 inches, 6¼ pounds, sale price $2.50.

M-2 *Lumber Camp*, 18 x 24 x 6 inches, 14¾ pounds, sale price $3.00.

M-39 *American Farm*. Folding model, sale price $7.00.

M-40 *American Farm*, detailed, sale price $5.00.

National Lumber Manufacturers Association, 1337 Connecticut Ave. N.W., Washington, D.C.

Wood Samples. Set of 48 specimens, labeled, sale price $1.95 per set.

Romeyn B. Hough Co., Lowville, N.Y.

Wood Samples. Set of 72 species (216 specimens) of wood of the northern states, $5.00. Also set of 68 species (204 specimens) of wood of the Pacific slope, $5.00.

Teaching Material Service, 205 East 42nd St., New York, N.Y.

Paper and Pulp. Chart 38 x 25 inches showing paper making process. Outline map of the United States forest areas. Sample of pulp solution. Price 50 cents.

Petroleum. Chart 38 x 25 inches with pictures of petroleum industry. Sample of crude oil. Price 50 cents.

Ward's Natural Science Establishments, Inc., P.O. Box 24, Beechwood Station, Rochester, N.Y.

Collections of Minerals and Rocks

MC-3 *Student Collection of Minerals*, 36 examples, $4.50.

MC-4 *Beginners Mineral and Rock Collection*. Set of 25 minerals and rocks, price $1.25.

MC-5 *Beginners Mineral and Rock Collection*. Set of 70 specimens in strong bag, price $2.75.

Physiographic Models

PD-1 *Young Valley*. Price $5.00.

PD-2 *Old Valley*. Price $5.00.

PE-1 *Young Rock and Drift Coast*. Price $5.00.

State Departments and Agencies

The following agencies distribute exhibits and realia within limited areas.

Delaware State Board of Fish and Game Commissioners, Dover, Del.

Florida Forest and Park Service, Tallahassee, Fla.

Iowa State Conservation Commission, Des Moines, Iowa.

Michigan Department of Conservation, Educational Division, Lansing, Mich.

Mississippi State Game and Fish Commission, Jackson, Miss.

New York State Conservation Department, Arcade Building, Albany, N.Y.

West Virginia Conservation Commission, Charleston, W.Va.

MUSEUMS (Serve limited areas)

Archeological Society of Southern California, P.O. Box 482, Pasadena, Calif.
Buffalo Museum of Science, Humboldt Park, Buffalo, N.Y.
Franklin Institute of Pennsylvania, Philadelphia, Pa.
Maryland Academy of Sciences, 2724 N. Charles St., Baltimore, Md.
Museum of Northern Arizona, Fort Valley Road, Flagstaff, Ariz.
New Jersey State Museum, Trenton, N.J.
North Carolina State Museum, Raleigh, N.C.
Philadelphia Commercial Museum, 25th and the Parkway, Philadelphia, Pa.
San Diego Museum, San Diego, Calif.
Taylor Museum, 30 W. Dale, Colorado Springs, Colo.
Valentine Museum, 1015 E. Clay St., Richmond, Va.
Washington State Museum, University of Washington, Seattle, Wash.
Witte Museum, San Antonio, Tex.

PART SEVEN

METEOROLOGY

In some high schools, meteorology is one of the units in the course in physical geography and in other high schools meteorology is a separate course. Regardless of the placement of the topic in a course, the content makes significant contributions to an understanding of the Air age. As aviation becomes more and more common place, high school students interested in flying must acquire the necessary knowledge in meteorology.

Regardless of where a class or school happens to be located, meteorological data is available. Observations of the weather elements are experiences that require the use of the immediate environment. Thus a planned study of such observations and their systematic classification and interpretation give meaning to the local weather. They also fit into the total weather picture for larger areas.

METEOROLOGY AND THE HIGH SCHOOL*

Thomas F. Barton
Southern Illinois Normal University

During the last three decades the number of courses added to the high school curriculums has been increasing with an accelerated tempo. Now with war emergency courses demanding the immediate attention of high school administrators, this rapid growth has become an avalanche. Consequently, the judicious high school principal attempts to evaluate the war-born courses in terms of short-range or war expedient courses, and long-range permanent courses. The writer believes that if meteorology were given an opportunity as a war-time subject it would win a permanent place in the curriculum.

This paper will present briefly five of the many problems which should be considered before meteorology is placed in the high schools. The five problems selected for special treatment are: 1. Objectives; 2. Meteorology and the Curriculum; 3. Personnel; 4. Books and Equipment; 5. Methods.

Objectives

Altho the war is emphasizing aviation meteorology, I believe that few high school curriculums can become so diversified as to offer courses on aviation meteorology. Consequently high school meteorology should be taught as a multiple-functional course rather than a unifunctional one serving some specific occupation such as aviation or agriculture.

Most educators and administrators will agree that some of the objectives which at all events should be kept in mind in the teaching of meteorology are these.

1. To live in an Air Age and to furnish many with scientific information to aid them in flying.
2. To be conscious of the importance of healthful atmospheric conditions in industrial and commercial establishments as well as at home.
3. To understand the influence of weather upon various occupations.
4. To consider meteorology as a vital part of the physical environment in planning the future use of our natural and

* Presented at the annual High School Conference, University of Illinois, November, 1942.

human resources, and

5. To secure a firm physical science foundation for further learning.

METEOROLOGY AND THE CURRICULUM

Assuming that meteorology should be studied in the high school, how much time should one allow for this subject? Should elementary meteorology be offered as a semester course, or should it be part of a year's work in Aeronautics, General Science, or Physical Geography?

At the present time it is being offered in all three ways: as a semester course in Elementary Meteorology, as part of a year's work in Aeronautics, General Science, or Physical Geography.

In stressing aeronautics, many of the large industrial high schools wanting to offer a semester's course in meteorology found that they lacked a good text. Such a text was soon written by Finch, Trewartha, Shearer and Caudle, entitled *Elementary Meteorology,* and published by McGraw-Hill.

Other high schools have placed a year of aeronautics in their curriculum. Most of the texts written for a year of high school aeronautics contain a unit on meteorology. In *Elements of Aeronautics* by Pope and Otis, Part IV, "Meteorology," occupies 107 pages of the 642 pages of subject matter. In Collins' *Elements of Pre-Flight Aeronautics for High School,* Unit II is entitled "The Ocean of Air," and one-sixth of the subject matter is devoted to meteorology. *Science of Pre-Flight Aeronautics for High Schools,* by Joseph and others, contains seven parts, one of which is meteorology. In this book the 187 pages of meteorology make up a little less than one-fourth of the book.

Most of the texts used for General Science courses contain a unit on weather or climate. For example in *Science for Today,* by Caldwell and Curtis, Unit V, "How Weather and Climate Affect Us," covers 25 of the 712 pages. In *Problems in General Science* by Hunter and Whitman, Unit XVII is entitled "Weather and Climate," and covers 26 of the 666 pages. *Everyday Problems in Science,* by Beauchamp and others, has a unit on weather called "What Makes the Weather Change." This unit contains 36 pages while the complete book contains 714 pages of subject matter. Consequently it is apparent that weather units in General Science are too short for the teaching of meteorology in a way to meet the

objectives which should be obtained.

Meteorology, as a part of Physical Georgraphy, is not an innovation as far as textbooks are concerned, altho it may have been slighted in the high school classes. *New Physical Geography* by Tarr and Von Engeln, one of the earlier and most widely used Physical Geography texts, has three chapters on meteorology. However, only 87 out of 608 pages, or about one-eighth of the subject matter, is on meteorology. Two of the more recent texts for physical Geography are Fletcher's *Earth Science;* and Finch, Trewartha and Shearer's *The Earth and Its Resources.* Eight of the thirty-three chapters in Fletcher's book are on meteorology and climate, and about one-fourth of his subject matter is meteorology.

In the earlier Physical Georgraphy texts most of the subject matter is devoted to landforms, and meteorology receives minor treatment. Then, in 1941 with the publication of *The Earth and Its Resources,* appeared the first high school text presenting meteorology before landforms. In this book eight of the nineteen chapters and one-third of the subject matter deal with weather and climate. Out of the 196 pages on weather and climate, 132 are on meteorology. Moreover, the appendix, on Meteorological Instruments, and the Weather Map are much more elaborate and detailed than the treatment devoted to the same topic in the appendix of the other books mentioned. Thus we see that as new texts are being written for Physical Geography courses, the stress placed on meteorology has been increasing. Moreover, today many high school instructors in their Physical Geography courses are devoting more time to meteorology. Mr. Shearer, of the Westport High School, Kansas City, and co-author of *The Earth and Its Resources,* has an article in the September issue of the JOURNAL OF GEOGRAPHY entitled "Aeronautics and Geography."[1] Mr. Shearer believes that in a modern full-year course of physical geography or physiography one "should devote, perhaps, an entire semester to meteorology and climate."[2]

The writer believes that the most expedient and desirable long-range plan to follow for most high schools in Illinois, and in the United States, for that matter, is to add meteorology to the curriculum by making it a unit in a year's physical geography course. About one-third of a year's physical geography course should be

[1] Shearer, M. H. Aeronautics and Geography," JOURNAL OF GEOGRAPHY. 1942. Vol. 41, pp. 228-233.
[2] *Ibid.*, pp. 231.

meteorology, and the weather should be discussed the first part of the class hour thruout the year. In the large and technical high schools a semester of meteorology could easily be offered. Army and Navy Air Forces are urging high schools to offer a semester of meteorology.

Another curricular problem is to decide in what year in high school meteorology should be offered. It seems logical that if meteorology were to be offered as a unit of physical geography it should be studied by sophomores and juniors. That a physical geography course should be a prerequisite for aeronautics is ably proven by Shearer in his article, "Aeronautics and Geography." Moreover, the writer believes that meteorology as a vital part of physical geography should be a foundation on which to build the social studies, the biological sciences, and other physical sciences. Certainly, physical geography should be a prerequisite to other high school geography courses such as Economic Geography, Conservation, and Political Geography.

PERSONNEL

Who should teach the meteorology course or the meteorological unit in Physical Geography? Certainly, no one who has not completed a college or university course in the subject should teach it. Moreover, from the standpoint of academic training the more meteorology a prospective teacher has had the better. Some colleges are now offering five semester hours in meteorology. College geography students who, as freshmen, have taken *Elements of Geography* by Finch and Trewartha, and who later have had a good course in more advanced meteorology should be well prepared to teach the subject. Moreover we find that some of our students take a two hour course in "Meteorology for Pilots" in a Civilian Pilot Training course or in some branch of our Armed Service. As a result some of our geography majors have had a total of six semester hours in meteorology.

The high school teacher of meteorology in the future may be a young man who has flown an airplane in all kinds of weather and who has had a year's work in one of the Institutes of Meteorology. Two of our geography majors are now at the Institute of Meteorology in Chicago and two graduated in the November, 1942 class. Graduates from other colleges and universities are also attending and will attend these institutes. Moreover, some of our geography

majors have had one or two years of actual experience in taking official United States Airway Weather Observations. Many of these well-trained young men if given the opportunity will teach meteorology in high schools when the war is over.

In the high schools where meteorology is offered as a part of physical geography, the teacher should be a geography major or minor with four semester hours of college meteorology. Moreover, the teacher if possible should have practical experience as an official weather observer or as a flyer. If I were principal, I should want a geography major or minor to teach the subject, because meteorology should not be a unifunctional unit for aeronautics, but a multiple-functional unit, as a basis for other subjects as well. I feel that meteorology should be taught so that its various phases will be equally treated instead of so that emphasis is placed solely on flying. I have discovered from my limited contact with instructors teaching a year of aeronautics that they would like nothing better than to have meteorology taught to their pupils in a physical geography course. Such a procedure would give the teachers more time for other phases of aeronautics.

If meteorology is offered as a part of physical geography, it should be required of all sophomores and juniors. We now live in an Air Age, whether we fly an airplane or not. Students should learn to think in terms of world atmospheric conditions and in terms of the world's physical environment as well as in terms of world political happenings. Such information and world understanding are as important for winning the peace as for winning the war.

BOOKS AND EQUIPMENT

For a semester course in Meteorology at present, I know of only one textbook, *Elements of Meteorology* by Finch, Trewartha, Shearer and Caudle. To supplement this book, I should use Bulletin 25, *Meteorology for Pilots.*

Two of the best books on the market for a year's Physical Geography course that give adequate treatment to meteorology are: Fletcher's *Earth Science,* published by D. C. Heath, and Finch, Trewartha and Shearer—*The Earth and Its Resources,* published by McGraw-Hill.

In the high school library to be used with the Meteorology unit should be as many as possible of the following reference books:

Albright, John G.: *Physical Meteorology*, Prentice-Hall, Inc. New York, 1941.
Blair, Thomas A.: *Weather Elements*, Prentice-Hall, Inc. New York, 1942.
Bliss, George S.: "Weather Forecasting," Bulletin 42 of the U. S. Weather Bureau, Government Printing Office, Washington, D.C., 1939.
Brooks, Charles F.: *Why the Weather?* Harcourt, Brace and Co., Inc., New York, 1935.
Byers, H. R.: *Synoptic and Aeronautical Meteorology*, McGraw-Hill, Inc., 1937.
Climate and Man, 1941 Yearbook of Agriculture, Government Printing Office, Washington, D.C.
Codes for Cloud Forms and States of the Sky, Circular S. W. B. No. 1249, Government Printing Office, Washington, D.C., 1938.
Duncan, Richard: *Air Navigation and Meteorology*, The Goodheart-Wilcox Co., Chicago, 1930.
Gregg, Willis R.: *Aeronautical Meteorology*, The Ronald Press Company, New York, 1930.
Haynes, B. C.: "Meteorology for Pilots," Civil Aeronautics Bulletin 25 of the U. S. Department of Commerce, Washington, D.C., 1940.
"Instructions for Airway Meteorological Service," Circular N of the U. S. Department of Commerce, Weather Bureau, Washington, D.C.
"Instructions for Making Pilot Balloon Observations," Circular O of Aerological Division, U. S. Department of Commerce, Weather Bureau, Washington, D.C.
"Instructions for Modulated Audio Frequency Radiosonde Observations," Circular R of the U. S. Department of Commerce, Weather Bureau, Washington, D.C.
Meteorology, Special Test 193 of the Army Extension Courses, Government Printing Office, Washington, D.C.
Qamias, Jerome: "An Introduction to the Study of Air Mass Analysis," Bulletin of the American Meteorological Society, Milton, Mass., 1940.
Petterssen, Sverre: *Introduction to Meteorology*, McGraw-Hill Book Co., Inc., New York, 1941.
Shields, Bert A.: *Meteorology and Air Navigation*, McGraw-Hill Book Co., Inc. New York, 1942.
Starr, Victor P.: *Basic Principles of Weather Forecasting*, Harper Brothers, New York, 1942.
Sutchiffe, R. C.: *Meteorology for Aviators*, Chemical Publishing Corp., New York, Inc., New York, 1940.
Taylor, George F.: *Aeronautical Meteorology*, Pitman Publishing Corp., New York, 1940.
Trewartha, Glenn T.: *An Introduction to Weather and Climate*, McGraw-Hill Book Company, Inc., New York, 1937.
Weems, P. V. H.: *Air Navigation*, McGraw-Hill Book Company, Inc., New York, 1938.
Weightman, Richard Hanson: "Forecasting from Synoptic Charts," U. S. Weather Bureau Miscellaneous Publication 236, Superintendent of Documents, Washington, D.C., 1940.

I especially recommend the government publications because a small investment brings you all of them.

One of the weakest points in meteorological equipment is the paucity of workbooks. *Laboratory Exercises in Physical Geography* by Shearer is a supplement to *The Earth and Its Resources*. Clarence Koeppe's *Weather and Climate*, published by McKnight and McKnight in 1939 will be found useful.

Two of the small but useful governmental publications which

every high school teacher should have if he teaches geography, whether it contains a unit on meteorology or not, are, namely: "The Illinois (or the state in which you live) Section of Climatological Data" and "Weekly Weather and Crop Bulletin." "The State Section of Climatological Data" is usually published monthly at state capitals by the Weather Bureaus, and can be secured for twenty-five cents a year. It contains data collected by the cooperative weather stations in your state. One of these weather stations will be somewhere near your high school, if not in your home town.

The weekly "Weather and Crop Bulletin" is prepared by the Weather Bureau, U. S. Department of Commerce, and is sent free to educational institutions or libraries.

Some of the chief criticisms made by our Armed Force Officers of the way geographers offer meteorology are:

1. That we do not stress accuracy and exactness
2. That we do not acquaint students with instruments nor give them the opportunity to work with instruments in laboratory and
3. That we teach the subject simply as an introduction to climatology.

These three criticisms can largely be met by offering laboratory work with desirable meteorological equipment. What would a minimum list of equipment include? Mr. Caudle, Coordinator, Civilian Pilot Training, University of Wisconsin, Extension Division, and co-author of *Elementary Meteorology* for high schools recommends as a minimum the following equipment:

1. Maximum and minimum thermometer
2. Psychrometer
3. Barometer
4. Wind vane
5. A simple cylindrical rain gauge
6. A subscription for the daily weather map.

The list is less elaborate than the equipment listed as necessary laboratory apparatus for a year's course in physiography in Circular No. 298, entitled *Laboratory Equipment, Apparatus, and other Aids for High School in Illinois,* published by our Superintendent of Public Instruction in 1938. Few high schools have the equipment on either list.

In fact, many of the Geography Departments of the colleges and universities do not have the meteorological equipment recommended in Illinois Circular No. 298, nor do they all teach their stu-

dents in a meteorological laboratory or by class demonstration how to use the equipment. Moreover, it is one thing to watch a person demonstrate a piece of apparatus and another to use it yourself in securing accurate meteorological data.

If the Geography Departments do not have adequate meteorological equipment for laboratory work to train teachers, then perhaps we should have the Physics or Physical Science Departments offer the work and we should send our majors and minors to these departments for their training in meteorology. In fact, if we do not meet the challenge of this rapidly growing laboratory subject, the work will be taken over by some other department. Meteorology will not stay suppressed any longer, nor will it as an introduction to climatology, be sufficient. Either college and university geography departments must offer a multiple-functional meteorology course with adequate equipment to serve aeronautics as well as geography, or some other department will.

Between one-fifth and one-fourth of the credit earned in a high school meteorology course should be obtained by working in both an indoor and outdoor laboratory. Without priorities you cannot buy meteorological equipment, but that will be no excuse for lack of equipment when the war is over.

A course in meteorology or a unit of meteorology may be offered without laboratory exercises or instruments, but we should recognize from the start that such a course is inferior and the teacher handicapped.

Not only should the high school student be given an opportunity to work with meteorological instruments at school, but he or she should be encouraged to set up an inexpensive weather station of his own if he has not already done so.[3]

METHODS

If meteorology is to be taught as a textbook subject only, then it should not be added to the curriculum. Of course a good or excellent textbook is an important aid.

But daily description and interpretation of the weather as well as six to twenty-four hour weather predictions are vital in learning meteorology. The weather drama never ceases, and the scenes in our latitude are ever new. Fortunately, for interest as well as for physical vigor, the tempo of the drama is not monotonous. Each

[3] For detailed information refer to Barton, Thomas F., "Establishing an Inexpensive Weather Station," JOURNAL OF GEOGRAPHY, 1941, Vol. 40, pp. 226-230.

weather map is different. Some days the weather map and the weather can be discussed in a few minutes; on other occasions it may occupy half or all of the class time.

The daily observation of weather should be supplemented by the use of instruments in the laboratory and out of doors. If meteorological instruments are available, the students can take daily readings and code their findings as they would appear on the United States Weather Map. Then when the daily weather map comes a few days later they can enter their data upon it. This practice is followed by some Streator High School students as an extracurricular activity, altho meteorology is not taught as a unit of study. With proper equipment, high school students could take observations and practice coding the data similar to the six hour readings taken by the United States Airway Weather Stations. In this way they would become interested in and familiar with teletype reports.

Field trips should be taken. Perhaps, it will be a field trip of an hour to visit the local Cooperative State Weather Station; or it may be a half-day trip to a Second Class Airway Weather Station near your school or to the Geography Department of a college or university. Then, if at all possible, a half-day or day should be spent at a First Class United States Weather Station and at a large commercial airport. Moreover, a trip to a large department store or factory to study modern heating and cooling systems will prove stimulating. The use made of weather instruments and the complex system necessary to control atmospheric conditions inside a building are instructive. It is to be understood that all of these trips should be carefully prepared by the class instructor and the person in charge of the place to be visited before the trip is made.

Films, both sound and strip, as well as glass slides and pictures, are now available if priorities have not intervened. Erpi has just recently released a new sound film which is up-to-date in every way, including mass air analysis. The United States Weather Bureau is a source of excellent glass slides as well as of pictures and cloud charts.

A meteorology club could be established and meteorological news items carried in the high school paper and the club's official publication. One of the most successful Weather Clubs of the states is in the J. Sterling Morton High School at Cicero, Illinois. This club prepares a mimeographed monthly weather publication called the

Weather Vane. The club has been in continuous existence since its establishment in 1932.

CONCLUSION

Administrators and teachers who hastily and haphazardly add meteorology to their curriculum can only do the subject harm. But with careful planning this important physical element of geography, weather, can be added to or enlarged in the curriculum at a time when a world crisis spotlights its importance in this field.

TEN YEARS OF HIGH SCHOOL METEOROLOGY

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The administration of the Albuquerque High School felt the need of added emphasis on courses which dealt with the aeroplane. They felt this need far back in the early 1930's even in the hard depression years when the aviation industry was making a valiant struggle but gaining practically no ground. In those days there were many serious people who proposed that the schools concentrate on the arts and skills of living as pleasantly as possible in a controlled and regimented life. The teaching of science and mathematics was losing ground, and many people figured that these subjects demanded too much, and prepared you only for opportunities which were gone with past prosperity, never to come again. The schools were fighting to keep parts of their curriculum alive, hoping and believing that better times would come. It was a bad time for the administrator who believed that sometime soon the world would inevitably demand trained men and women. Such dreams included the expenditure of money and money was scarce in 1936.

The Albuquerque High School program had begun with courses in aircraft mechanics. In 1936 courses in air navigation and meteorology were proposed. Suitable textbooks for the two courses were not available and it was necessary for us to prepare our own material. The books were mimeographed and the writer remembers well the difficulties in getting necessary funds for the job.

Now we are looking back on ten years' work in these courses which were once so difficult to justify but that turned out to be such a fortunate "shot in the dark." The course of air navigation

is a rather specialized one but the same is not true of the meteorology course which precedes it. This more general course will be the object of the discussion here, and the writer wishes to present certain problems which might be of interest to teachers who work in this field.

First of all a course must be justified before it is included in the school curriculum. Meteorology is the most common of all topics for American conversation and yet the science about which the least is known by the general public. From a cultural point of view, alone, the study of the subject would be deemed justified. Weather and climate as determining factors for every day life thruout the world suggest that these factors be given added importance in the studies of history and economics. The studies of weather and climate can be expanded to take in the important subjects of government and political, social, and economic geography, subjects which are probably not included in the school curriculum. People in many walks of life are directly dependent on the daily weather reports and more people should be educated to take advantage of the Government services offered. People engaged in the aviation industries are dependent upon meteorology as a basic study. Such reasons are a few which can be advocated for including the study in a school curriculum.

The new study had to be fitted into the school curriculum which was already crowded. This did not offer much trouble as the course in meteorology (and air navigation which followed it) were assigned to the Science Department as electives for either grade eleven or twelve. The courses could also be counted as vocational training for the students who specialized in aircraft mechanics and who wished to work for a vocational diploma.

The course in meteorology did not require a great deal of expensive equipment. We have a complete set of world maps and two large globes. We have some meteorological charts, two large atlases, and a set of the Encyclopedia Britannica in our classroom. From the United States Weather Bureau we have considerable material including several types of weather maps, climatic summary data, cloud charts, and special maps which deal with the movements of "fronts." For experiments we have the full run of a well equipped physics laboratory. Downstairs in the aeronautics shop we have access to numerous aircraft instruments which are studied. From past contacts as a teacher with the C.A.A. during

the War the writer has considerable material, including some examinations given to Air Corps flyers. The local Civil Air Patrol has been helpful and the same is true of the local Weather Bureau. Our students have access to the Albuquerque High School library and in addition to the libraries of the City, the University of New Mexico, and the United States Soil Conservation Service.

Our textbook was written specifically for us and for our problems but we do not aim to be slaves to it. The text serves as the general outline of the course but every effort is made to correlate the daily activities with the happenings of the times. The instructor seeks to send out each student as a seeker of information which will apply to the course being studied. The class, in part, acts as a clearing house for information brought in from many sources. The writer has taught graduate students in college, service men in officers training, adult trade apprentices, and high school upper classmen and he finds that a great many of these high school students are as capable of doing a good research job as their elders. Use is made of these willing and capable students who are sent in the pursuit of knowledge. It is an education for them and for the class in which they report their findings.

The instructor uses a point grading system and our classroom work includes: (1) laboratory experiments, (2) work on weather maps, (3) working of problems, (4) discussion of questions in the text, (5) topics for independent research and report to class, (6) viewing and discussing motion pictures and slides, (7) directed study, and (8) examinations. The instructor is naturally desirous of full student participation. Since the class is an elective one it receives many students who are really interested in learning. It also receives a number who are interested only in obtaining a half credit of school work. The person who most often seeks the half credit is generally the chronic "flunker" and the entrance of that person is not sought in the class. We seek the person who wishes to take meteorology for one semester and air navigation the next semester as a continuing course. The chronic drifter is often discouraged by knowing the course is on the difficult side and that once in it he will have to do the work "or else." The course is not designed just as a pleasant interlude for some future hobo. Students have gone from this course to become Army meteorologists and pilots. One was an Army major and an air ace. In December 1946 Admiral Denfield of the United States Navy gave us an official

commendation for pioneering these courses. Part of our course procedure comes from suggestions which our former students, now workers in the field, have given us. Accordingly we insist on a fair standard of performance on the part of the student. This is known and the chronic searcher for the easy way generally passes us by.

Some of the classroom procedures listed in the preceding paragraph will be taken up in some detail.

LABORATORY EXPERIMENTS

In our work thruout the semester we do a number of experiments. With a spotlight and a large globe we illustrate the seasons of the year, the solstices, and the equinoxes. By an exposure meter we show how the inclination of the light rays govern the amount of radiant energy received in different zones in different seasons. We make a crude inverted thermometer of the Galilean type. Students learn to read thermometers correctly and to change Fahrenheit readings to Centigrade and vice versa. Weight of air is determined by analytical balance. Instruction is given in the reading of the barometer and students practice reading it and keeping a record for several weeks. Various experiments with air pump, bell jars, and Magdeburg hemispheres bring out the air pressure relationships. Altitude variations are determined by use of an aneroid barometer and a salvaged altimeter. "Analysis" of air is carried on by extracting the oxygen by means of wet steel wool, phosphorus, or pyrogallic acid. By use of sulphuric acid the absolute humidity of a measured quantity of air is determined. Relative humidity is determined by use of the dew point apparatus and by the sling psychrometer. A home made cloud chamber is constructed. A Cottrell precipitator is made and used to settle out smoke. Radiant energy is measured by the foot-candle meter and checked, roughly, by a radiometer. A crude anemometer is constructed and tested in a breeze supplied by an electric fan. This same fan is used to supply the air for our home-made wind tunnel in which we test a few air foils. Our static machine supplies the central piece of apparatus for demonstrations in atmospheric electricity, lightning, and the use of lightning rods. On occasions we have determined the specific heats of soils, the heat of fusion of ice, and the heat of vaporization of water. In our experiments we rely heavily on the apparatus to be found in the physics laboratory. Often, also, the instructor presents the idea of a piece of apparatus

to be used and the interested students will go about constructing some set-up which will do the job properly. The set-ups are often crude but the instructor feels that these crude makeshifts, which are the group's own, are often better as teaching devices than apparatus especially designed for the purpose. There is also the factor of economy which must be kept in mind.

WORK ON MAPS

Our discussions and classroom work often deals with maps and charts. During the course we make a rainfall map of the United States and of our own State. From Weather Bureau statistics we construct wind rose diagrams for several cities. Students draw up a general chart of the world wind system and show how the land masses act as modifying factors. A regular series of practice maps obtained several years ago from the Weather Bureau and the C.A.A. Navy Pilot Training service furnish us with opportunities to draw in isotherms and isobars and obtain a certain facility in interpreting the station model. Other duplicate maps of six day weather sequences offer us opportunity to trace movements of lows across the United States. Weather Bureau code tape is obtained and the records translated into station models.

WORKING OF PROBLEMS

The higher mathematics approach to the study of meteorology cannot be defended for high school students and such an approach is not attempted. The problems we deal with can be worked by arithmetic, algebra, and geometery. Centigrade thermometer readings are changed to Fahrenheit and vice versa. Pressure is converted to altitude and altitude back to air pressure. From air temperature and dew point we figure cloud heights and from cloud heights and air temperature we figure relative humidity. Problems on relative humidity as determined by wet and dry bulb thermometers and by dew point apparatus are taken up in some detail. Force of air on different surfaces at various velocities is presented. From angle sights on clouds the cloud height is determined graphically.

DISCUSSION OF QUESTIONS AND TOPICS FOR INVESTIGATION

The textbook used contains a large number of questions at the end of each chapter. These questions act as a starting point for classroom discussion. All class members are encouraged to enter

into the discussion. Occasionally the instructor will give a quiz of a few questions to start the lesson out. This is used as a means of increasing student participation in the discussion and also as a means of ascertaining who is reading the assignments. Students are urged to bring up relevant questions for mutual consideration.

Special topics related to the chapters in the textbook are assigned to volunteers. These volunteers consult various sources to find material on their topic. These assignments are given out several days in advance and at a given time the volunteer is to present his findings to the class in an oral report. Special "point" inducements are provided for encouragement of the students who wish to look up these subjects. Some very good jobs of research are done by the students and such assignments are provided to encourage this sort of work. The subjects dealt with in this research are chosen especially to show how the weather and climate have ramifications which reach into all phases of human life. In the next few paragraphs the writer will present the chapter headings in the textbook. Each chapter is followed by from six to thirty topics for independent research and discussion and also by a large number of questions on the subject matter of the textbook. The text's chapter headings are:

The Introduction. Chiefly an historical sketch of the progress of weather study from the past to the present.

Chapter I. The Atmosphere.
Chapter II. Heating and Cooling of the Atmosphere.
Chapter III. Variation of Atmospheric Pressure.
Chapter IV. Water Vapor in the Atmosphere.
Chapter V. Rain, Snow, and Hail.
Chapter V. Relationship Between Air Pressure and Wind. The General Wind System of the Earth.
Chapter VII. Secondary Wind Systems and the Storms.
Chapter VIII. Making the Weather Map.
Chapter IX. Forecasting the Weather.
Chapter X. World Weather or Climate.
Chapter XI. Miscellaneous Weather Phenomena.
Chapter XII. Climates of the Past.
Chapter XIII. Weather for the Aviator.
Chapter XIV. Meteorology for Everyone.

It has not been thought advisable to list the many research topics which we take up under these chapter headings. If in our selection of the topics we seem to journey far afield it is for a definite reason. We feel that the study of weather and climate is a basic part of an individual's understanding of history, economics, and

sociology. We feel that the geographic factor is one of the most powerful influences in shaping the peoples and the customs of the world and a knowledge of basic geography, and the effect of climate on it, should be a part of any science curriculum.

MOTION PICTURES AND SLIDES

Slides and motion pictures can show many things which are difficult to present in other fashions. We can obtain some training films directly from the local Army Air Base. Some come from the C.A.A. and some from the C.A.P. A good many teaching films are put out by various companies such as the Erpi Films. Our school has a large room set aside for the purpose of showing films and slides only and our director of visual education has been very helpful in obtaining material for us.

DIRECTED STUDY AND EXAMINATIONS

There are times when we are working on maps or on problems and this work is conducted under supervision. There is nothing unconventional in our approach to this sort of work. The same is true of our examinations which are given thruout the course. At the end of the course several examinations from the C.A.A. or the Army Training Program are given and a large percentage of our students pass these tests successfully.

CONCLUSIONS

At the present writing we are entering our eleventh year for our course in meteorology. During the World War we were lauded for such teaching because it had so much direct bearing on the training of aviators. We were even commended for looking into the future and divining the Nation's needs five years in advance. We did not see into the future any more than did our political leaders. We felt that a course in meteorology would be helpful regardless of what trade or profession a student chose to enter. We still believe so. For some the training in meteorology will undoubtedly be helpful in aviation work but we realized at the beginning that few of our students would follow this as a profession. We feel that the course must be justified on the grounds of being a broad basis for the understanding of world civilization. If this makes it a study of weather and climate and their bearing on the past, present and future rather than the strict application of weather to the aviator alone, then we feel that our course is worth

while. We feel that such a course should be continued as a basic part of our understanding of world peoples and cultures.

FILMS AND REFERENCES

The following films are currently listed for showing in our course:

Aerodynamics. 1 reel. Erpi Film. University of Wisconsin.

Jet Propulsion. 2 Reels. General Electric Co.

Tidal Theory of the Earth and Moon Creation. Pathe Company. Walter and Gutlohn.

Earth and Its Seasons. 1 Reel. Erpi Co. University of Wisconsin.

Aerology. Thunderstorms. 4 Reels. U. S. Navy film.

The Atmosphere and Its Circulation. I Reel. Erpi Company. University of California.

The Weather. I Reel. Erpi Company. University of California.

Modern Weather Theory. 2 Reels. U. S. Army Air Forces.

Development and Characteristics of Atmospheric Waves. 1 Reel. U. S. Army Air Forces.

All the films we use are 16 millimeter in sound. Our best film strips are obtained locally from the Civil Aeronautics Authority. The Jam Handy Company of New York also has several film strips which we use on a rental basis.

In addition to a set of encyclopedias and several atlases we have the following books and pamphlets available in the classroom:

Arnold and Eaker. *The Army Flyer*. Harper and Brothers 1942.

Arnold and Eaker. *This Flying Game*. Funk and Wagnall 1935.

Arnold and Eaker. *Winged Warfare*. Harper and Brothers 1941.

Beauchamp and others. *Learning About Weather*. Scott Foresman 1945.

Becker. *Einführung In Die Astronomie*. German Army Standard 1943.

Bowden. *Study Guide for Meteorology*. Civil Pilot Training Publishing Co. Stockton, California, 1943.

Brands. *Meteorology*. McGraw-Hill Co. 1944.

Buck. *Sparring with the Weather*. Aero Insurance Underwriters Company 1944.

Case and Bergsmark. *Modern World Geography*. Lippincott 1936.

Caudle. *Workbook in Elementary Meteorology*. McGraw-Hill 1945.

Cave. *Clouds*. Cambridge Press 1926.

Christofferson. *Demonstrations and Laboratory Experiments in the Science of Aeronautics*. McGraw-Hill 1945.

Civil Aeronautics Authority: (List follows)

Bulletin 20. Study Outline for Primary Ground School 1939.

Bulletin 22. Digest of Civil Air Regulations 1942.

Bulletin 25. Meteorology for Pilots 1940.

Bulletin 26. Aerodynamics for Pilots 1940.

Bulletin 27. Pilots Airplane Manual 1940.

Bulletin 29. Pilots Radio Manual 1940.

Clevenger. *Modern Flight*. Noble and Noble Co. 1941.

Cohen. *Flying High*. Macmillan 1940.

Cross. *Wings for You*. Macmillan 1942.

Davis. *Elementary Meteorology*. Ginn and Co. (Old book but good.)

Denoyer. *Teacher's Manual for Cartocraft Globes*. Denoyer-Geppert Co. 1936.

Dorrah. *Certain Hydrological and Climatic Characteristics of the Southwest*. University of New Mexico Press 1946.

Field and Stetson. *Map Reading and Avigation*. Van Nostrand 1942.

Finch and others. *Elements of Meteorology.* McGraw-Hill 1942.
Finch and others. *The Earth and Its Resources.* McGraw-Hill 1943.
Fiske. *Exploring the Upper Atmosphere.* Oxford Press 1934.
Floherty. *Aviation from Shop to Sky.* Lippincott 1941.
Frances. *Aviation.* Bobbs-Merrill 1943.
Free and Hoke. *Weather.* McBride Co. 1928.
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ELEMENTARY METEOROLOGY IN JUNIOR HIGH SCHOOL GEOGRAPHY

PETER GREENLEAF
Junior High School 223, Brooklyn

World conditions today have brought into clear focus the tremendous importance of meteorology in connection with aeronautics. Since the fundamentals of meteorology are first taught in the junior high schools, it is of vital importance that it be presented so as to enable the pupils to grasp the principles involved in nearly all phases of weather observation and interpretation of conditions.

Here is presented a method which can be used in the junior high schools whereby students can develop an interest in and an understanding of daily weather observations. It will especially give to them the ability to make short range forecasts.

At the beginning of each class period during the day weather elements are checked and observations entered on chart arranged as follows and posted in the science or geography room.

ELEMENT	9:00	9:45	10:30	. . . ETC.
Temperature—Dry Bulb °F				
Temperature—Wet Bulb °F				
Relative Humidity				
Precipitation				
Wind Velocity (Code)				
Wind Direction				
Barometer (in. Hg.)				
Type Clouds				
Remarks				

Each group of observers forecasts tne weather using its own observations in conjunction with preceding reports Forecasts are based on the following rules:

1. A falling barometer indicates an approaching "low" with a storm.
2. A rising barometer indicates the passing of the "low" and the approach of a "high" and fair weather.
3. The passing of a "low" in summer, will be followed by warmer weather.
4. The passing of a "low" in winter will be followed by colder weather, perhaps with a "cold front" blowing from the "Far North" and with blizzards in regions east of the Far West.
5. Winds from the south or southeast foretell of a "low" coming from the west with its center to the north of the observer, and with rain to come within 24 hours or sooner.
6. Winds from the east or northeast foretell of a "low" coming from the west with its center to the west or to the south of the observer, usually with heavy, chilly rain, and cold weather.
7. Winds swinging from the southeast to the southwest indicate that the center of the "low" is to the east of the observer and that fair weather will follow shortly.
8. Winds swinging from the east or northeast to the northwest also indicate that the center of the "low" has passed to the east of the observer and that fair and colder weather will soon follow.
9. Cirrus and cirro-stratus clouds, coming from the west with a gray sky, indicate the approach of a "low" with a storm.
10. A bright blue sky with cirrus wisps and with the wind in the west or northwest will be followed by fair weather for 24 to 48 hours or longer.
11. A bright blue sky with numerous cumulus clouds may be followed by strato-cumulus and rain or snow flurries during the middle of the day and early afternoon, but fair at sundown.
12. Calm, humid, warm to hot days during the spring may be expected to produce thunder storms.
13. If the lightning of a thunderstorm appears to the northwest, west or southwest, the thunderstorm will come nearer the observer and perhaps pass overhead.
14. If in fall or spring the temperature falls at the end of a clear, calm day to 40 or 45 degrees Fahrenheit one may expect frost in all low places by morning.
15. Frost will not form under the conditions above if clouds cover the sky before the morning or if a wind of any sort blows during the night.
16. Dew will form every night if there is no wind and the sky is clear so that ground heat may be radiated to space.

The 2:15 P.M. forecast should be posted on the bulletin board of the school. It has been found that such forecasts relating to predictions for the evening and night are 80% accurate. "Observers" are rotated in each class and perform their duties without specific direction. Precipitation and wind velocity observations can be descriptive rather than quantitative if appropriate equipment is lacking. In such cases use the code recommended by the United States Weather Bureau in their pamphlet titled "Weather Forecasting."

KEEPING A DAILY RECORD OF THE TEMPERATURE

MAMIE L. ANDERZHON
Oak Park, Illinois

ASSIGNMENT

A daily record of the temperature which we may use for observation of temperature change from day to day, month to month and annually. (The record is made for the student's home community.)

EQUIPMENT

1. Thermometer (It is convenient to have a weather box protect the thermometer and barometer outside the classroom window. Such a box can easily be made and fastened to the window ledge outside so the window can be opened when readings are taken. Otherwise you may use the facts you know about the position of the sun, to choose a window where the thermometer will be protected from the direct rays of the sun. Why would you choose a north window if you live in the Northern Hemisphere?)
2. Wrapping paper—approximately 20 inches by 16 inches (1 for each month)
3. Strips of paper cut from typewriter paper ½ inch by 11 inches, divided into tenths. A heavier line may denote each tenth space. (If you live in a latitude where the temperature rises above 100° and falls below 10° longer strips will be needed for these days, since this scale of one-tenth inch on the 11 inch strip numbers from —10, 0, 10, 20, 30, etc. to 100.)
4. Daily Weather Reports from the local newspaper
5. Monthly and Annual Weather Reports from the U. S. Department of Commerce

BACKGROUND

1. The highest and lowest temperatures should be recorded whether the chart be a daily, monthly or annual recording since it is the extremes in temperatures which affect the crops during the growing season and also play an important part in determining the length of the growing season.

2. Growing temperature is considered to be 50° and above.

Above 86° is VERY HOT
68° to 86° is HOT
50° to 68° is WARM
32° to 50° is MILD
14° to 32° is COLD
Below 14° is VERY COLD

DIRECTIONS

1. Thermometer readings may be made daily. A plan should be agreed upon and followed systematically. The plan should include:

Hours the readings are to be made, such as say every hour, or 9:00 A.M., 12 o'clock noon, 3:00 P.M., or whatever other time-intervals are convenient.

The arrangement of the chart must be planned. Different colors may be used for each time of day the temperature is recorded. In this way the line for each time is easier followed.

2. In preparing the chart it should probably be approximately 20 inches by 15 inches.

The heading may include: MONTH, YEAR; PLACE; CLIMATE; Students or committee responsible. The days will appear at the top of the chart for each vertical column that has been ruled into convenient spaces.

3. Place a dot on the line of temperature in the center of the vertical column for the day the recording is made. Since this is a line graph showing several daily recordings the dots for each hour on each day should be connected by a characteristic line or colored pencil as suggested above.

4. Using the temperature reports of the local newspaper record in red pencil or in some other distinguishing manner the highest and lowest temperature for each day. Mark the hour this temperature is recorded on the colored line. In this way you will have a record of the highest and lowest readings with which you can compare your readings.*

STUDENT'S COMPARISON SUMMARY

1. From your daily records of temperature note the hour the temperature is highest and lowest. Is the temperature highest when the sun is at high noon? How do you explain the difference between the 9 A.M. temperature and the 3 P.M. temperature for any day when both times are 3 hours from the high noon sun position?

2. Observe how the temperatures vary from day to day, week to week, and month to month.

3. What days of the month under observation are frost-free? What months are frost-free. How do frost-free periods affect the growing season?

4. If you keep a temperature chart for September and October observe the temperature after the first frost. We often speak of this period after the first frost as Indian Summer. Why? Note this period on your temperature charts.

* Climatic charts such as published by the University of Chicago. Dr. Henry Leppard, editor, are valuable for keeping monthly and annual climatic records.

STUDENT'S SUMMARY

1. It might be suggested that a daily weather report be issued, possibly at 1:00 P.M., each day compiled by the chairmen or students on the different committees. This report might be a mimeographed or dittoed form designed by the students and can include the following, plus any other data suggested by the students.

DATE
TIME

Temperature reading (Can be a thermometer designed by the students)	Pressure reading (A barometer design) by a student

WIND DIRECTION
and
velocity if available
(high or low wind can
be indicated)

PRECIPITATION
Rain
Snow

PREDICTION:
Weather yesterday:
Temperature Highest
Lowest
Pressure Rising
Falling
Wind Direction
Precipitation Kind
Amount

Signed by the students or committee.

OBSERVING THE POSITION OF THE SUN THRU A SYSTEMATIC RECORDING OF SHADOWS

MAMIE L. ANDERZHON
Oak Park, Illinois

ASSIGNMENT

Recording the change in the length of shadows thru a cycle of seasons, and relating this change in the length of shadows to where we see our sun thruout the cycle of seasons.

EQUIPMENT

1. Yardstick
2. Wrapping paper (length varies with the length of the shadow each month)
3. Pencil, paper
4. Scissors
5. Lettering pen and ink

DIRECTIONS

This is an activity we shall repeat:

1. Every month of the year.

2. On the same day, preferably the 21st of the month or as near that date as possible.

3. At the same time of day, preferably 12 o'clock noon.

4. Using the same student (preferably the shortest one in the class, you'll see why in December).

5. At 11:45 measure the length of the shadow of the student selected to have his shadow made each month.

6. Cut wrapping paper the length of the shadow plus 6 or 8 inches for good measure.

7. Letting the student who is having his shadow drawn stand on one end of the paper, another student will trace the shadow with chalk or pencil.

8. Cut out the shadow and carefully letter the following data on the silhouette as this information will be useful in later comparisons.

a. Date shadow is made.
b. Time of day the shadow is made.
c. Height of the student whose shadow is being made, in feet and inches.
d. Length of the shadow in feet and inches.
e. Is the shadow longer or shorter than the student?
f Angle of the sun.
g. Number of daylight hours on this day and number of hours of darkness. (This information can be secured from the weather report found in the daily newspaper.)

9. Since this assignment is carried out once each month for a year it is best to plan a place for hanging the shadow silhouettes so that the monthly change can be observed, and compared.

STUDENT'S SUMMARY OF RECORDED DATA RELATED TO SHADOWS

Summarize your data to include the following:

1. Name of your community where you are making the observations.

2. Details of arrangements such as date, hour of the day and months for which the recordings were made.

3. How does the length of shadow compare with the length of daylight hours. The longer the daylight the (longer or shorter) the length of shadow.

4. The longer the shadow the (higher or lower) the noon day sun for that day.

5. During what months do the shadows tend to be approximately the same length? Why?

Write the conclusion to your observation in the most precise language you can so you cannot be misunderstood.

You may wish to observe the change in the length of shadow each hour for a day. September 23, December 21, March 21 and June 21 are good times for making such observations.

Such an observation might illustrate Robert Louis Stevenson's "My Shadow."

> I have a little shadow that goes in and out with me, . . .
> The funniest thing about him is the way he likes to grow—
> Not at all like proper children which is very slow;
> For he sometimes shoots up taller like an Indian-rubber ball,
> And he sometimes gets so little that there is none of him at all.

If desired a stationary short pole can be used instead of a student for the entire observation. (There are accounts of how the Egyptians, Incas and Mayan peoples observed the positions of the sun thruout a cycle of seasons. They often used a fixed pole. You may want to explore some of these sources.)

A DAILY RECORD OF THE DAYLIGHT AND DARKNESS

Assignment

A chart showing the change in the length of daylight and dark each day of 24 hours thru a cycle of seasons.

Equipment

1. Wrapping paper or cardboard (12 sheets, one for each month cut to convenient size, possibly 36 inches (vertically) by 30 inches (horizontally)
2. Weather reports from the daily newspaper showing the hour

of sunrise and sunset for the day.

3. Lettering pen and ink

Directions

1. At thė top of the sheet for each month record:
   a. Hemisphere (north or south)
   b. Location of observation (name of place and geographic index, namely latitude and longitude)
   c. Season (spring, summer, autumn, or winter)
   d. Month and year
   e. In a vertical column list the number of days for the month.
2. Arrange horizontally across the top of the sheet:
   a. Hour of sunrise
   b. Hour of sunset
   c. Number of hours and minutes of daylight
   d. Number of hours and minutes of darkness
   e. Minutes change from the day before, if more light place a plus before the number of minutes if less place minus
3. The change and record can also be kept either as a bar graph or better, 2 circles each divided into 12 parts as a face of a clock or 1 circle divided into 24 parts similar to a 24 hour clock.

Student's Comparisons

As you add to your records from month to month what do you observe concerning: 1) the comparison of the length of the shadow with the length of the daylight hours? 2) The length of daylight as related to the position of the noonday sun?

PART EIGHT

GEOGRAPHY AND THE LOCAL COMMUNTTY

The geographic study of the local community is one of the most valuable phases of geography. Such a study gives the student an opportunity to observe the interrelationships of man and the physical environment. It also offers an opportunity to apply his knowledge of geography.

Because geography concerns itself with the out-of-doors, geography can be seen in some of its many phases and forms of expression in every community. Resource materials of various kinds remain unobserved and unused. The community may be considered the geography laboratory and thus serve to give reality to geographic factors and conditions. A paraphrase of a state motto sums up the importance of the place of the local community: "If you seek a knowledge of geography, Look about you."

NEW MATERIAL FOR HOME GEOGRAPHY

Harriet Carter
Frick Training School for Teachers
Pittsburgh, Pennsylvania

Every community has valuable geographic material in its midst. Whether the interests of the community are farming, mining, manufacturing, or trading, the people need markets for their products, and they buy necessities and luxuries from far and near.

An investigation of the trade of the home region furnishes facts to challenge a study that will lead to the geographic truth that what people do in any region is affected directly or indirectly by the natural environment. Each community of the world, at home and abroad, has developed, more or less, in accordance with its own resources. This basis for the modern interpretation of international relations is strikingly illustrated in many communities where the wealth of six continents meets to supply the comforts of man.

Today each community has become a neighbor to the world. No home region can be studied fully without reaching across the oceans to other lands.

Home Geography in Pittsburgh is studied for twelve weeks in the sixth year of the elementary school. At this time, the geography of the United States has been completed to the northeast section, and the study of the home community becomes a part of the work on the basic industries of manufacturing iron and steel, and of mining coal. Closely related to these industries is the commerce of our three rivers—the Monongahela, the Allegheny, and the Ohio. Following these studies, two weeks are spent on the fruit and vegetable supply for Pittsburgh.

The purpose of this last unit is to give a survey of the differences in seasonal temperatures thruout the United States, to call attention to the widespread distribution of rich farming sections, and to emphasize the interdependence of city and farm dwellers, of different regions in the United States, and of the United States and foreign countries.

The origin of fruits and vegetables received in Pittsburgh in 1933 was plotted on a blackboard wall map, with the number of carloads from each state and foreign country (Fig. 1). It is a striking picture of our dependence for food upon forty states and more than eight foreign countries.

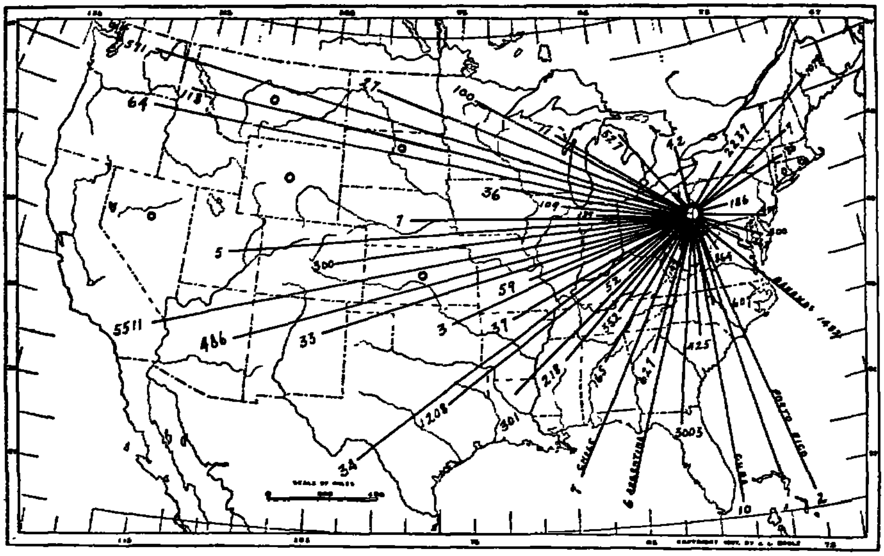

FIG. 1

The appearance of this map in class caused a spontaneous flow of questions. They could be classified into four types. These are examples:—

What did Colorado send us in the 300 carloads?

Why bring fruits and vegetables from Washington state when they grow nearer?

How could the seven carloads brought from Chile be sold for enough to pay for the transportation?

Does Texas send any of the 1208 carloads to us in the summer?

From a similar map of our potatoes, we discovered that twenty-one states raised potatoes for the Pittsburgh market and sent an average of ten carloads each day of the year. A potato production map of the United States was consulted and the relative advantages of the regions were considered. The apple map presented the puzzle, "Why did Washington send 436 carloads into western Pennsylvania when our state produced one bushel of apples per capita?" A graf of the monthly shipments of apples by states showed the rivalry between Washington and New York. Our tomatoes in carload lots came largely from the South yet we knew that many were raised in our own and neighboring states. That raised a question that needed further study.

From each of the "four corners" of the United States, in one year, came more than 500 carloads of fruits and vegetables to help

feed the people of Pittsburgh and vicinity. From Washington came 571 carloads; from California, 5511; from Maine, 1079; and from Florida, 3003.

The seasonal distribution of many of the products can be shown grafically by grouping the states of origin on the basis of length of growing season. For example, green beans were shipped from Florida from November to May, from Georgia and the Carolinas in May and June, and in October and November, and from Virginia, Maryland, and New Jersey in June, July, and August. A graf of these facts shows the seasonal journey of this bean crop to the south and back to the north. Celery and strawberries make similar journeys to the north for the summer and to the south for the winter.

A graf showed that our winter cabbages came from New York and from the extreme South. Two questions appeared. How could New York have cabbages in the winter? How could Florida growers compete with the New York shippers and pay freight for nearly one thousand miles?

These grafs and maps presented the situation so vividly that questions were raised and search made for facts *because there was a need* for the information. Geography became a study of the pulsating life today, of which each pupil was a part.

The accompanying detailed plan sent to each sixth grade teacher, illustrates the scope of the work and the richness of the material. Similar statistics may be obtained from many large cities in the United States.

FRUIT AND VEGETABLES FOR PITTSBURGH

Upper Sixth Grade — Time—Six lessons

I. The Purpose of this Unit
  A. To emphasize the dependence of cities upon rural communities
  B. To emphasize thru personal experiences the interdependence of city and farm dwellers. Farmers must be able to buy manufactured products so that the factories may pay to their workers enough to buy farm products.
  C. To give a general survey of differences in seasonal temperatures thruout the United States
  D. To emphasize the wide-spread distribution of rich farming sections thruout the United States
  E. To emphasize the interdependence of different regions in the United States
  F. To emphasize the dependence of Pittsburgh upon foreign countries

II. Challenging Facts
  A. In 1933, Pittsburgh received fruit and vegetables in carlots from forty states. (All except Vermont, Connecticut, Rhode Island, Montana, Idaho, Nevada, South Dakota, Kansas.) Reference A, page 2.
  B. In 1933, twenty-one states raised potatoes for Pittsburgh, and sent an average of ten carloads to the city each day of the year. Reference A, page 14.

C. In 1933, Pittsburgh received from foreign countries, each day of the year, an average of four and two-thirds carloads of fruit and vegetables.

Reference A, page 2.

III. Suggestions for Procedure

A. Preliminary Committee Work

1. The Wholesale District Committee

The teacher and five or six pupils visit the wholesale district Saturday morning preceding the beginning of this unit of work, or at some other convenient time.

a. Attend the Auction in the Fruit Exchange Building as early as possible, not later than nine o'clock. Find what is being done. Examine the printed lists which the men use in bidding.

b. After the auction, walk down the platform to see the fruit and vegetables which were sold at the auction. Talk with the agents and read labels to find where the products grew. Try to find what they sold for and what the freight charges were.

c. Visit some of the wholesale stores nearby. Notice where the products were grown. Ask what causes the variation in prices from day to day. To whom do these stores sell?

d. Try to see the inside of a refrigeration car being unloaded or ready to unload.

2. The Neighborhood Committee

The class appoint a committee for interviewing the fruit and vegetable sellers in the school neighborhood. Assign two pupils for each interview.

a. Make lists of the fruit and vegetables sold, with place where each was grown.

b. Find where the seller buys his products and how they are brought to the store.

B. Introductory Lessons

1. Have "Challenging Fact A" written on the blackboard.

a. Each make a list of the fruits and vegetables that you think came to Pittsburgh in 1933 in carlots.

b. Class make a composite list on the blackboard, after each pupil has had time to write at least ten on his list.

c. Check each product which you think is coming to Pittsburgh this week. Where might it come from? Why?

d. Check the answers from maps in Reference B, page 136, 176. Use Index for other products.

e. Each pupil list at least five states which probably did not send fruit or vegetables to Pittsburgh. Make composite list on the blackboard. Each give his reason for excluding the state.

f. Have the eight states not sending fruit or vegetables, colored white on the blackboard map, by pupils, as the teacher names them one at a time.

g. Class discuss reasons for these states not shipping to Pittsburgh. What maps should help us check our answers?

(Rainfall, Fig. 33; population, Fig. 80; physical map; Reference B.)

h. Before next lesson look at the fruit and vegetables in the stores near your home. Know the names of those you see.

2. Reports of Committees

a. The Wholesale District Committee

(1) How fruit and vegetables are received, handled, and sold in the wholesale district in Pittsburgh

(2) What fruits and vegetables were in market and where each grew

b. The Neighborhood Committee

(1) What fruit and vegetables were in the neighborhood stores

(2) Where they grew

(3) How the storekeeper got his supply

Note: Mark regions on blackboard outline map as they are given in the reports, with the initial letter, perhaps, as "p" for potatoes.

C. Work for Each Pupil

1. On a United States outline desk map, write the number of carloads of potatoes sent by each of the twenty-one states to Pittsburgh. Draw lines from each to Pittsburgh.
2. On a second map put two products, apples or onions, and watermelons.
3. List the conditions favorable for growing potatoes.
   Examine the potato map, page 176, Reference B.
   Read again about potatoes in Maine and in other states. Use Index in *Reference* B.
   Can you think of any reasons for Pittsburgh getting one-third of its carloads of potatoes from Maine?
4. Compare the number of carloads of potatoes received in Pittsburgh in winter and summer. Reference A, page 14.

December	167	June	532
January	125	July	492
February	140	August	443

Does this mean that we eat fewer potatoes in winter?
How do you explain the difference?

5. Study this record of the number of carloads of potatoes shipped by months from some of the states along the eastern coast.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Florida		5	21	57	84							
Maryland						1	55	11				
New Jersey							61	304	122			
N. Carolina					1	309	20					
S. Carolina					39	37						
Virginia						88	351	6				

Reference A, page 14.

Can you find any facts here which prove there is a "potato journey" north?
Explain. Reference B, page 160.
Why none from these states in October, November, December?

6. More than one-third of the carloads of apples received in Pittsburgh in 1933 came from New York, and nearly one-third came from Washington.
   What apple regions are near Pittsburgh? Reference B, Index.
   How can the apple growers in Washington afford to pay the freight for the long distance, about 2500 miles, and sell their apples in Pittsburgh which is near so many apple regions?
7. Seasonal changes in regions from which beans were shipped to Pittsburgh in 1933.

Make vertical bar grafs from the following data:
Notice the "journey north and south."

Carlots	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	States
30													
20													Florida
10													
0	11	20	27	24	31						26	37	
30													
20													Texas
10													
0				21									
30													Louisiana
20													Georgia
10													S. Carolina
0					23	8	1			2	7		N. Carolina
30													
20													Virginia
10													Maryland
0						15	17	10					New Jersey

Note: The numbers are the carlots shipped from the state or group of states during the month. Reference A, page 4.

D. Individual Reports
   1. Grafs made on a large-sized paper. Explain to class.
      a. Seasonal changes in regions from which strawberries were shipped Reference A, page 15.
      b. Seasonal changes in regions from which tomatoes were shipped Reference A, page 16.
   2. Map showing states of origin for carlots of tomatoes unloaded in Pittsburgh in 1933
      Put the number of carlots in the states of origin, on the blackboard map of the United States and draw straight lines from each number to Pittsburgh. Explain to class.

E. Pupils' Notebooks
   1. United States outline map showing the origin of potatoes for Pittsburgh in 1933
   2. United States outline map showing origin of apples or onions and watermelons for Pittsburgh in 1933. Reference A, pages 11, 3, 17
   3. A graf showing seasonal changes in regions from which beans were shipped to Pittsburgh in 1933
      Have statistics on the blackboard. After similar grafs are made by individual pupils and explained to the class, each pupil will work independently on the graf for beans.

IV. References

A. Unloads of Fruit and Vegetables at Pittsburgh, Penna., 1933 Annual Report, United States Department of Agriculture, Bureau of Agricultural Economics, Market News Service
   Note: A copy of this report has been sent to each school.
B. United States and Canada: Barrows and Parker.
C. World Almanac.
   Annual. Good for current statistics. Fifty cents at book stores
D. Yearbook of United States Department of Agriculture

Free from your Representative in Congress. Address is, House of Representatives, Office Building, Washington, D.C.
Valuable for current statistics of production.

THE LOCAL COMMUNITY AS A RESOURCE FOR TEACHING HIGH SCHOOL GEOGRAPHY

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THE PROBLEM IN GENERAL

The worst shortcoming of courses in the teaching of geography, it seems to me, is their tendency to dwell on deeply involved theory rather than to get down to cases and teach what to do, and how to do it. The result is often that new teachers enter their classrooms with their eyes so fixed on the hills in the purple distance that they are scarcely aware of the warm brown earth under their feet. A ship sailing in the South Atlantic opposite the mouth of the Amazon found itself nearing the end of its fresh water supply. Having signalled a passing ship in quest of a new supply, the captain was astounded by the reply, which was, "Dip down where you are." "But," he remonstrated, "We need *fresh* water." And again came the reply "Dip down where you are." Somewhat skeptically, the captain complied, and thus learned what he should have known—that the Amazon does not at once diffuse with the sea, but maintains its identity for a considerable mileage east of its mouth in the South Atlantic.

There are various reasons why relatively little use has been made of the rich geography teaching resources to be found in an industrial community. Teachers have misunderstood the field trip, and their misuse of it as a teaching tool has put it in disfavor with administrative officers. Students cannot be expected to be enthused about field work unless they get satisfaction from it. All this is unfortunate in view of the deep satisfactions inherent in the understandings which could be developed from even the most elementary field work, properly planned and executed.

The educational values to be derived from a field trip are rarely found by simply viewing an industrial process. This is the most common error of so-called field work. Possibly the following example will serve to illustrate just how a visit to an industrial establishment may be made to function in the direction of achieving some of the major aims of geography teaching.

FIELD WORK IN ACTION—AN EXAMPLE

The industrial agglomeration of Massillon, Ohio, presents some intriguing facets, none of which is so interesting as its blast furnace and associated coking plant. Some weeks ago I visited this establishment with a group of senior high-school students in economic geography.

Some study of the larger pattern of steel districts in the United States preceded the visit. In connection with this, the sources of major raw materials and the transportation systems involved in their delivery was examined.

For convenience in conducting the trip, the group of 180 students was divided into three groups of 60 each. We first examined the location of the establishment, which is along the west bank of the Tuscarawas River, just south of the city limits of Massillon. Here is a large plot of level land, high enough to avoid the frequent floods of this erratic stream, but accessible to the railway lines which follow it on the flood plain below. Indeed, the natural layout here is fortunate, for the two adjacent land levels make unnecessary the digging of storage pits for the iron ore and limestone.

Next we examined the coking plant. We learned that two great coal fields supply the raw material. These are the sources of high quality coking coal most accessible to Massillon.

1. The Northern Appalachian field. The Connellsville area produces coal with a high percentage of carbon. The Republic steel company controls a portion of this area adjacent to the Pennsylvania railway, which connects New York and Chicago. Massillon is on this railway.

2. The Middle Appalachian field. Pocahontas coal is rich in the gases from which the by-products of the coking process are drawn. Coal from this field moves to Great Lake ports by way of the Baltimore and Ohio and Wheeling and Lake Erie railways. Both of these lines find Massillon on their direct route from the coal field to the lake ports.

Coals from these two fields are mixed at the coking plant in the proportion of twelve Connellsville to three Pocahontas, in order to secure the greatest advantage from their combined characteristics. Ohio coal once constituted a small percentage of the mixture. But it proved unsatisfactory, and its use was discontinued.

It was noted that the by-product recovery plant handled only the four basic by-products: 1) Coal tar, which is sold by the carload

lot to the Columbia Chemical Company at Dover, Ohio, which company recovers the numerous products locked up in this material; 2) Ammonia gas, which is bubbled thru sulphuric acid to make ammonium sulphate, which is sold at the plant for fertilizer; 3) Benzol, which is sold to oil companies which blend it into a motor fuel; 4) Fuel gas, which is used to provide part of the power used to generate electricity for the associated steel mill, and also for heating purposes in the steel mill.

The major function of the coke plant is to provide coke for the blast furnace, but a little coke is sold for domestic fuel.

Our attention was next directed to the blast furnace. There is something dramatic about the furnace itself. We watched for a few minutes the process of drawing off the molten metal and slag. We noted that usually the metal is carried in ladles to the nearby steel mill, and the portion of metal which the mill is not at the time prepared to use is cast into "pigs" and stored for use when the blast furnace is not operating.

It was pointed out at this point that the reason the corporation operates a blast furnace here instead of shipping in pig iron from a large steel district is that, due to the accessibility of coal, as previously indicated, it is cheaper to make "pig" locally. Under favorable price conditions scrap steel is substituted for a portion of the pig iron used in the Massillon steel mill.

We watched the loading of the "skip hoist," or car which carries the raw materials to the top of the blast furnace. We learned that the ore is of several sorts, and noted the names of the mines from which it comes. The reason several different ores are used is that each contains some material besides iron which is essential to steel making. For example, we learned that ores from upper Michigan have in them important amounts of manganese, which otherwise must be imported from Soviet Russia. This fact makes feasible the purchase of these ores along with that which is mined at Mesabi, altho the former are mined by the shaft method, whereas Mesabi ores are largely open-pit mined. Ore and limestone are brought to Massillon thru three Lake Erie ports: Cleveland, Lorain and Huron, and by way of the Wheeling and Lake Erie and Baltimore and Ohio Railways.

It is well known that blast furnaces and steel mills are located at points where there is available a plentiful supply of relatively clear water. This water is chiefly used for cooling iron and steel furnaces. We had always imagined that the Republic plant at Mas-

sillon drew its water supply from the river near which it is located, altho a speaking acquaintance with this erratic, silt laden stream should have warned us that this was not the case. Four wells, sunk in the deep glacial gravels which characterize northeastern Ohio, provide a dependable supply of water which needs only superficial treatment to prevent its clogging cooling devices in the furnaces; one of the myriad blessings bestowed by the great ice sheet.

The steel making establishment normally employes directly about one-third of Massillon's labor force. Several smaller establishments, notably a roller bearing plant, use locally made steel almost exclusively in their products. Indirectly the steel plant provides support for many additional workers, for employees' salaries and wages are largely spent in local business establishments. Since these establishments in town purchase much produce from the farms (mostly dairy) of Stark County, the influence of fluctuations in steel making at Massillon is felt outside the community. Many of the steel workers own homes in the community, and thru tax payments contribute to the support of local government and schools. This supplements the taxes paid by the corporation itself. Thus the steel plant plays a significant role in providing sustenance to Massillon. Logically, any threat to the continuance of steel making at Massillon commands great local concern.

We inquired about markets for steel made in the Republic plant at Massillon. It is evident that the new continuous strip mill built by the Corporation on the Cuyahoga River at Cleveland recently has taken over a good deal of the automobile business formerly handled in Massillon. This is because the new mill can assemble all raw materials more conveniently than is possible at Massillon. Likewise, it is more convenient to ship the finished product from Cleveland, than from Massillon to Detroit. Some automobile material, chiefly sheets, are still made in Massillon, but it is largely the small orders not economical to handle in the Cleveland mill. The most interesting of all the things we learned about this local industry came a week after the trip was made. It appears that Massillon is about to stop attempting to compete for the automobile business, and center its productive energies on what has long been a specialty here—stainless steel. Republic has announced the second expansion of its Massillon Stainless division in two years. This is in accord with Massillon's position at some distance from the Great Lakes and from a major coal field.

SUMMARY FROM THE STUDENTS' VIEWPOINT

Upon our return to the classroom, we plotted on outline maps of the United States the locations of the chief sources of raw materials, including the Middle and Northern Appalachian coal fields, the Mesabi and Michigan iron ranges, and the islands in western Lake Erie which supply the limestone. Lake ports and railways were placed on the map. A brief summary of the other data was written on the back of the map.

SUMMARY FROM THE TEACHER'S VIEWPOINT

The most important results are:

1. A fuller appreciation of the factors of local natural environment to which Massillon's steel industry is adjusted.
2. A better understanding of the relation of the steel industry of Massillon to the larger pattern of steel production in the United States.
3. An understanding of Massillon's position with relation to the major lines of transportation entering the community, and the relation of these lines to the Great Lakes and to two of our great coal fields. And as a result of these ideas comes the feeling that geography is related not only to Brazil, Java, or the Mesabi Range, but that, like charity, it begins at home. Every student attending the trip will, for its very occurrence, be able hereafter to travel more intelligently.

As rapidly as we can lay the groundwork for more trips, they will follow. We are fully committed to first-hand geography.

A HIGH SCHOOL CLASS SURVEYS ITS TOWN

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Toward the end of the school year 1940-1941, students in the economic geography class of Plymouth High School, Plymouth, Wisconsin, made a land-use map of their city. The class was a mixture of twenty-eight sophomore, junior and senior students. The project was carried out as an urban study and was, therefore, limited to the city itself. The project took two weeks.

Plymouth is a Dairy-Belt city located in the East-Central Wisconsin "kettles" region about sixty-five miles northwest of Milwaukee. It has a population of approximately 5,000, mostly German.

It is primarily a "cheese" community, competing with other Wisconsin cities for the title of "The Cheese Center of the World." Its position in a cheese-producing section of the Wisconsin dairy belt is reflected in the many industries engaged in the manufacture of cheese and allied products.

Permission and cooperation for the project were given freely both by the superintendent of schools and by the principal of the high school. Both helped in securing the necessary materials and in making arrangements for student work schedules. Miss Olive Thomas, a member of the geography department of the Whitewater State Teachers College, Whitewater, Wisconsin, was very helpful. To her, the teacher was indebted for suggestions of procedure and for the use of valuable printed materials.

A city map, published by a local engineering company, was used as a base map. The teacher divided the map into five large sections and made enough ditto copies of each section so that the students had ample base map material. A "master" map was later made, upon which the use of land in Plymouth was shown in color. Figure 1 shows a copy of the completed master map, with color symbols translated into black and white.

For working efficiency, the class was divided by the teacher into five committees—one for each large section of the city. Each committee then apportioned its section among its members, with each member responsible for a definite part. Some students chose to do the whole section, others only parts. Some areas of work overlapped.

After preliminary administrative arrangements, the project proceeded as follows:

- Step I. Working out of a time schedule with the students
- Step II. Preparation of the code and selection of areas of work
- Step III. The field work
- Step IV. Translating field notes into color on individual maps
- Step V. Making the master map

STEP I. WORKING OUT OF A TIME SCHEDULE WITH THE STUDENTS

Each student worked out an individual time schedule with the teacher. Arrangements were made with the office, with the homeroom teachers, and with study hall teachers for absence during school hours outside of the regular class period. The class period of fifty minutes was used during the two weeks of the project. After-school hours and weekend time were also used for field work. Using the class period and available study hall and homeroom

periods, the average student was able to spend approximately two hours a day working on the project.

Most students were out each day during the regular class period, altho it seldom happened that the entire class was out at once. From the third to the fourteenth day of the project—during the regular class hour—the students were:

A. in the field;
B. working in the classroom changing the field notes to color code, and putting both field map and colored map into condition for inspection by the teacher;
C. working on the master map (if they were on that committee); or
D. in conference with the teacher regarding their field work or map work.

STEP II. PREPARATION OF THE CODE AND SELECTION OF AREAS OF WORK

The code was worked up during two days of class discussion and assignments. The preparation of the code by the students helped to fix in their minds the meaning of land-use and also helped them to memorize the code much more quickly. In general, the work proceeded as follows.

First Day

A. General discussion of land-use; meaning of the term
B. Listing on the blackboard suggestions from members of the class as to the various types of land-use in Plymouth
C. Condensing all of the suggested types into thirteen major types
D. Organization of four committees to subdivide the major land-use types. Heads of committees were appointed and the types of land-use apportioned as follows:
   1. Residential, social, recreational, commercial
   2. Manufacturing
   3. Transportation, communication, utilities
   4. Agriculture, mining, forest-woods, etc.

   Each student chose the committee on which he wished to work. These assignments were due the following day. Time was allotted in class for the committees to work.

Second Day

E. Listing on the board the major types of land-use and the suggested subdivisions for each
F. Revision of the code upon suggestion either by the students or by the teacher
G. Choosing appropriate code letters—class participation
H. Choosing code colors—committee assigned to this and put to work immediately
I. Sending student to office to type off ditto stencil of the code. Copies run off and distributed to the class
J. Appointment of committee heads—students chose sections in which they wished to work (usually a section near home). Work apportioned within committees. Students signed up on the map of the city, designating work areas
K. Base maps distributed

CODE FOR PLYMOUTH LAND-USE SURVEY

R. **Recreation** (Blue)
c—commercial
n—non-commercial

RS. **Residential** (Green)
p—private (one-family)
d—duplexes
h—hotels

S. **Social** (Orange)
g—government property
e—educational—religious
i—institutions
c—cemeteries

C. **Commercial** (Red)
w—wholesale
r—retail

T. **Transportation** (Red with blue stripes)
r—railroads
b—busses
t—trucking—taxi

U. **Utilities** (Yellow with red dots)
e—electric—water
g—gas

CO. **Communication** (Green dots)
t—telephone
w—wireless
n—newspaper

W. **Warehouses—storage** (Black dots on white background)

M. **Mining** (Purple)

MF. **Manufacturing** (Yellow)
ch—cheese (including both manufacturing and processing)
a—bowling alley equipment
i—implements
g—grain
ca—canning
b—boxes (containers for cheese products)
t—tombstones
p—pastries—baked goods
d—dairies
pp—paper
bd—bandages (casings for cheese products)
sp—soda pop
c—cigars

A. **Agriculture** (Brown)
p—pasture
g—gardens
h—horticulture
c—cropland (other than gardens)

F. **Forest-Woods** (Green with brown stripes)

V. **Vacant—idle land** (White)

STEP III. FIELD WORK

All of the field work was done by the students themselves, either individually or in groups. The field work was carried out as follows.

A. Preparation for going into the field

At this point each student knew where he was to work and had so indicated to the teacher. Students were advised to use the following equipment in the field:

1. a 9 x 12 heavy cardboard sheet for writing on
2. two or three sharp pencils—no pen
3. a good eraser
4. a clamp or something similar for fastening base map to writing board
5. a sheet of scratch paper attached to the board
6. a copy of the code

B. Demonstration-practice lesson

The teacher gave the students a demonstration and practice lesson in the area

near the school. This area happened to be mostly residential and was fairly easy to identify and place in code on the map. During the lesson students were shown how to:

1. orient the map with the compass
2. observe the use of land

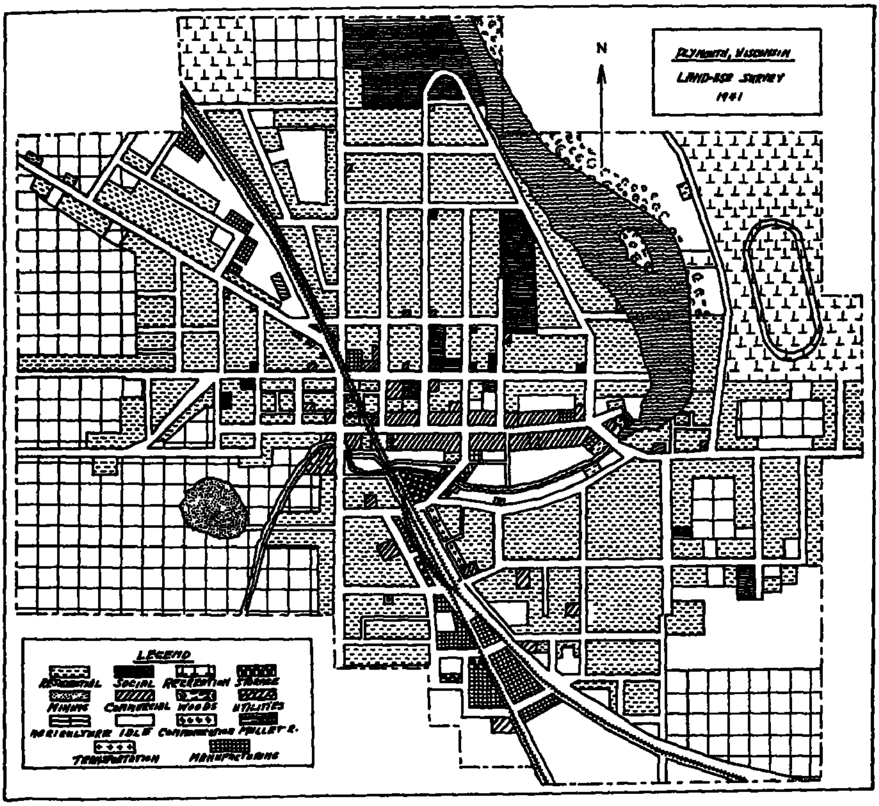

Fig. 1. Land use in Plymouth, Wisconsin (reproduced from colored map prepared by students).

3. indicate on the map by the code the use observed
4. mark off on the map approximate boundaries between various uses of land (noting the general relationship of nearby objects helped to establish boundary lines), and
5. check with other members the accuracy of observation and recording

As a result of this lesson, the area immediately adjoining the school was completed. The class then returned to the classroom and discussed problems and questions raised during the demonstration lesson. Students were now ready to begin field work.

C. Individual field work

Students did their field work during the regular class period each day, during study periods, during homeroom periods, after school, and on Saturdays. Trans-

portation was effected by walking, driving, or bicycling.

Code sheets were attached to the work board. As observations were made, the appropriate code was written on the base map. Approximate boundary lines were sketched in between the various types of land-use. Figure 2 is a composite of all the field notes taken for the southeastern section of Plymouth.

Students took more detailed field notes than were finally used in compiling the master map (Figure 1). For example, in mapping the areas used for *Manufacturing,* students also indicated by code the type of manufacturing (MFch—(*Manufacturing*) cheese). The decision to take more detailed field notes was

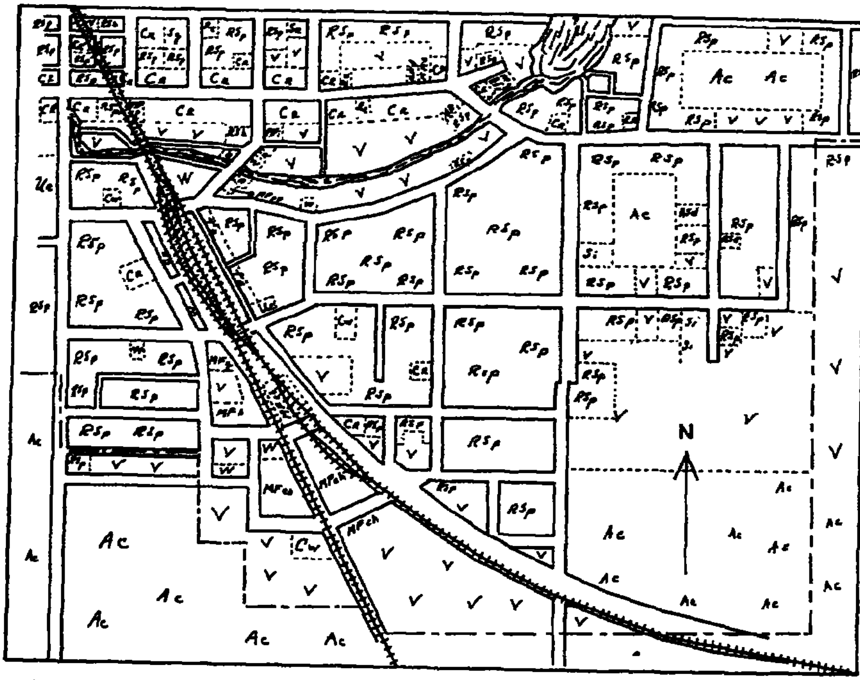

Fig. 2. Land use in southeastern section of Plymouth (reproduced from students' field maps). For explanation of symbols, see Code, page 181.

made in compiling the code. Student interest was the guiding factor in making the decision. These notes can be used at a later date in other work involving the geography of the home community. Because of the small scale of the base map and because of the lack of time, it was found best to confine our recordings on the master map to the major types of land-use.

STEP IV. TRANSLATING FIELD NOTES INTO COLOR ON INDIVIDUAL MAPS

Students worked independently on this part of the project, translating field notes into color code as they were ready. As each student completed his field work, he returned to the classroom, secured a clean copy of his section of the base map, and proceeded to record his field observations in color. He then turned in to the

teacher both his field map and his colored map. Students were cautioned about (1) naming the completed color map; (2) adding a neat legend to the map; and (3) the use of art principles in making the map as a whole.

STEP V. MAKING THE MASTER MAP

The master map was also executed in color code. A student committee of four was selected by the teacher to work on the master map. This was found necessary in order that the coloring on the map might be more uniform and in order that there might be a minimum of error.

In compiling the master map, the committee had access to all of the students' notes. Wherever discrepancies were found, those students whose work was involved were called upon to rectify the matter either by making corrections in the classroom, if possible, or by returning to the field for further observation and recording. Students were most conscientious about making corrections, doing much extra work to be sure that their maps were correct.

The completed master map was in pencil crayon. It was attractively mounted on heavy white poster board and put on display in the classroom. To heighten the display, samples of students' field notes and color maps, as well as a copy of the code, were fastened on the bulletin board surrounding the master map. This was done in such a way as to show the entire process of the map-making project.

Student enthusiasm was high thruout the entire project. At no time was it necessary to prod a student about getting his work done. Students who were normally classroom problems, discipline or otherwise, worked eagerly on the project.

WORK TO BE DONE ANOTHER YEAR

The final step in the project would be that of oral and written interpretations of the master map. Since the project was begun too late in the year for Plymouth High School students to complete this final step, work ended with the making of the master map. Next year, several steps might be taken to utilize the experience of this project:

A. The new class might make its own map showing land-use in Plymouth, as a check on the accuracy of the previous class, particularly the accuracy of boundaries for areas covering less than a city block.

B. The new class might do the oral and written interpretations of the use of land in Plymouth.

C. The new class might take sections—such as the manufacturing areas near the railroad—and enlarge and further classify them.
D. The new class might try the same type of project in a rural area.

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COMMUNITY VISION THRU GEOGRAPHY*

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During the last few years geographers have contributed much to aid the armed forces of the allied nations thru knowledge of foreign regions and thru special training in fact-gathering and fact interpreting. You and I know this and at times take it for granted, but does the public know of the value of geography? Does the public know what scientific geography really means? Does the public know of the need for sound geographic thinking in schools and in public life? I believe that until every citizen realizes the unique value of geography and geographic thinking as tools for use by adults, in understanding the problems of the local and world community, that geography will remain untaught in far too many high schools, colleges and adult education programs.

THRESHOLD OF GREATEST TEST

As teachers of geography we stand at the threshold of our greatest test. Now, as never before we must go back to our students with the drive of enthusiasm to make geography indispensable in the education of every citizen—without the stimulation of war! We must so teach geography that every history teacher realizes the important contribution geography can make to the full understanding of history. We must so teach geography that every planner at all levels—city, state, nation and world, becomes aware of the nature and scope of scientific geography and of its importance in

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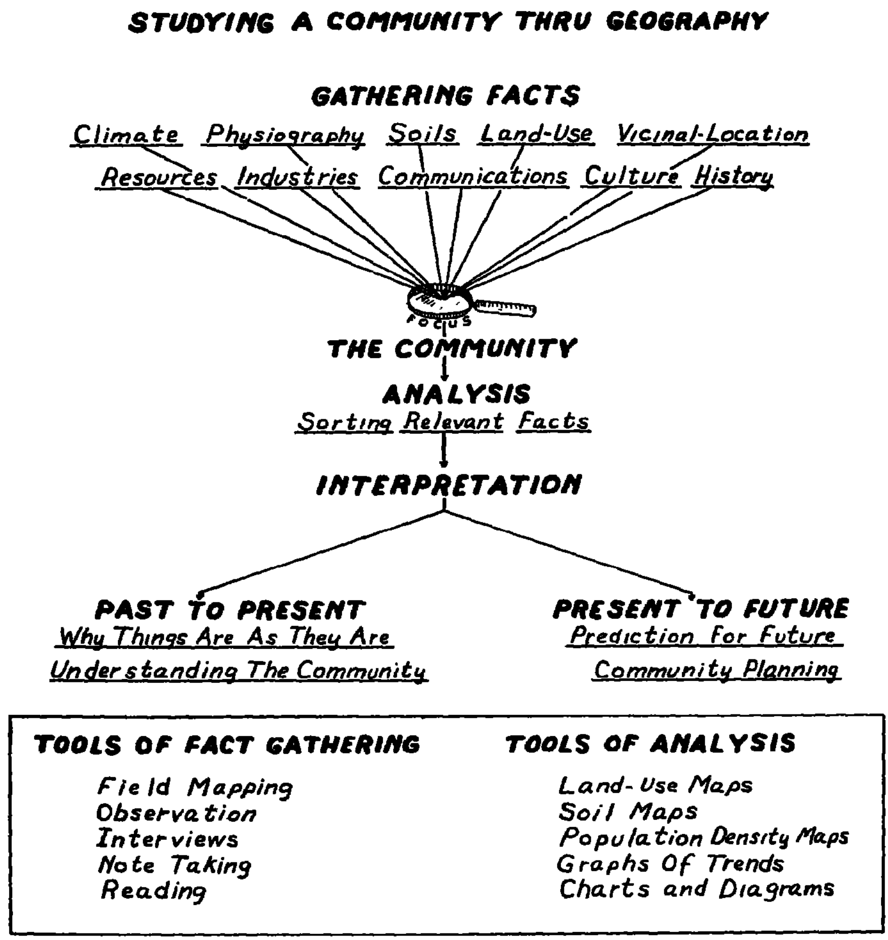
the task ahead. We must so teach geography that our pupils and students are changed for good toward being better citizens of the community and of the world as a result of having studied under us for a semester or perhaps several semesters. Here is a challenge. The time for action is *now!*

GEOGRAPHY MUST SHOW THE WAY

One way to make geography real is to turn our attention for at least part of a semester to the home environment. It is of first importance to recognize and understand local geographic conditions as a means of understanding the community, and later these same geographic observations and understandings will serve as a spring-



board for understanding comparisons with other parts of the world. I like to think of geography as the science that gathers all the information about the community and brings it into focus for analysis and interpretation. But, geography, if it is to be more than a dry classroom study, must go a step further and thru sound geographic interpretation of conditions, show the way that man must take if he is to achieve the optimum development of the community in terms of the natural environment. This is the basis of planning. There is great need for more and better geography in planning at all levels, world, nation, state and community. There is critical need for more and better geography teaching especially in the senior high school, college and adult education programs, for it is at these levels that you are training those who will soon do the planning and make the laws that put the best plans into action. In other words, it is not enough that we have good geographic thinking on the part of all citizens. Good sound geographic thinking and planning must be put to work! It is not our task to put it to work, but it *is* our task to teach with such enthusiasm, that our students, when they leave the schools and colleges, will use geography in understanding problems of local and world importance, that they will vote for, and influence other people to vote for, the law makers and professional planners who will make the best plans and who will put the best plans into action.

THE GEOGRAPHIC METHOD

This diagram is an attempt to visualize the method and objectives of studying a community, in the light of this philosophy of geography. The first step is that of gathering all possible facts of the environment which may influence the community. (The ten divisions here noted are not solely the concern of geography, tho the first six are recognized by most as the basis of geography. It is this basis in the physical facts of the environment that gives geography a firm foundation on which to build and that makes the science of geography the basis for the entire social studies program!) In this phase students must go out into the field, into the community to see conditions, to talk with all sorts of citizens, farmers, bankers and businessmen. Actual mapping of land-use is a necessity and even if a good map is already available, have each student make his own for at least a part of the area. The way to learn geography is to go out and do field work! I have on a number

of occasions made the statement that too many teachers were afraid to go out of the classroom because they knew too little about the local environment. It is high time we all learn more about things just outside of the window, for geography students more than other students must look up from the pages of the textbook to the soils and farms, to the fields and mountains, to the industries and resources that form the environment. These are the best texts.

Having gathered information over a considerable time the task of focusing the information is before us. Each bit of information is analyzed to see how it fits in, some facts have no bearing on a geographic study and are sorted out. Other facts, such as the presence of a long hill, may have influenced the pattern of streets or the location of business areas. These are the facts to be analyzed and classified for further interpretation.

INTERPRETATION FOR FUTURE GOOD

Interpretation is the synthesising process in which students begin to see how the facts of the environment, working together, influence the development of the community. Interpretation is divided into two levels. "Past to Present" is the lower level and should be reached in the junior high school grades. The emphasis here is placed on trying to understand how geographic conditions have influenced the development of the community to arrive at its present condition. As one moves into the senior high school, on into college and adult education there must be an increasing attempt to understand the influence of geography as a means of explaining *why* things are as they are. But, one must now go beyond this point and attempt to point the way to future good. It is time students start to think of how old industries can be kept from moving away, or think about replacing them with new ones that will fit into the geographic possibilities. It is time for all people to think geographically about questions such as "The United States and Oil in the Near East," the question of economic competition between New England, for instance, and the South or West, or the greatest question of all, the problem of maintaining peace in the world. How can anyone even talk intelligently about such questions without a clear understanding of the geography involved? How many adults, now out of school, really have a clear understanding of the influence that the airplane may have on the world and local community?

There is ample reason to say that geography in the upper levels of education had better begin to look out beyond the local scene as it is or was, to the scene as it probably will be and to ways of using the geographic environment to the best advantage.

FACTS MUST BE FOCUSED

Gathering and knowing facts is important, but they become valuable only when focused on some specific problem. We have long failed in this because geography stopped where it should have begun! In studying the community thru geography, our first aims are "understanding the community" thru knowledge of the geographic facts, and "why things are as they are" thru interpretation of these facts in an increasing degree as the grade is higher. All the information gathered, after sorting, may be woven into a definitive report on the community that should be of real value to teachers, pupils and parents. The higher level of aims should add to the definitive report, a section dealing with predictions of things likely to come based on the facts of the report and what ought to be done for the greatest good.

A CHALLENGE TO GEOGRAPHERS

Thru adequate geography teaching in the schools, colleges and adult education programs, properly correlated with all other subjects, it is possible to achieve real community vision based on knowledge of the geographic environment. This goal in itself is important, but there is yet another goal, that of using the local community as a spring-board toward understanding other communities and even the world. If we train students in a method, see that they know how to observe, how to analyze and interpret, they can then continue learning new facts and work out interpretation and understanding under any conditions that time and change may bring. Conditions are going to change for science is every day working wonders that affect geography. Moreover, some students in your classes today will be making the laws and doing the international planning, fifteen, twenty, twenty-five years from now when the powers may grow tired of policing the world. Will they be adequately trained in geography and geographic thinking to understand the problem?

It is up to you! The challenge is before you, accept it, and go back to your students with enthusiasm for the power of community vision based on sound geographic thinking!

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